



FRIDAY, FEBRUARY 9.

Contributions.

The Bologna-Brindisi Fast Train.

Società Italiana per le Strade Ferrate Meridionali Direzione dell'Esercizio Materiale e Trazione, Ufficio Centrale.
ANCONA, Jan. 17, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Will you permit me a word in reference to some remarks made in a recent number of the *Railroad Gazette*.

In your very interesting article on the "Comparative Speeds of the Fastest Trains in Europe and America,"* speaking of the Italian fast train between Bologna to Brindisi, I see the following remarks: "Which train is largely due to English enterprise."

I can assure you that this train is only due to the South Italian Railway Company, and the English government only pays a rate in force of an agreement between them and the Italian government for the transport of the English Indian mail, without any contract for the regulation of the service details of this train.

This train ordinarily consists of two or three American Pullman cars, three or four mail carriages and one van carriage. The locomotive is one having four coupled wheels and a bogie truck in front, weighing 40 tons. This type of locomotive was especially designed for this train.

ENRICO RIVA, C. E.

Inspector of the South Italian Railway Co.

Paper Wheels and Other Steel-Tired Wheels.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your issue of Jan. 12, page 17, an article signed "New England," relative to car wheels, which contained some very singular errors, that I, as a Master Car-BUILDER indorsing and using the Allen paper wheel, would like to see corrected. For instance, "New England" estimates the old 33-in. paper wheel, after the tire is expanded, at \$9.37½ and the old 42-in. wheel at \$10.40. Where could he have obtained these figures? It does not seem possible that that any Master Mechanic (and "New England" assumes to be in that position) can be ignorant of the fact that a 33-in. paper wheel can be re-tired for \$45.50, and that this sum, deducted from the original cost, \$75, is \$29.50 each, and as the centre is not injured by use—is in fact considered imperishable—the re-tired wheel is considered in all respects as good as the original one. It follows then that the two old 33-in. wheels "New England" puts down at \$18.75 are in reality worth \$59—a slight error of \$40.

The same is the case with his figures on the 42-in. wheel. Every one interested knows, or at least ought to know, that the cost of re-tiring the 42-in. wheel is \$54. The original costs \$85. This makes the "old wheel" worth \$31, or \$62 for the pair, instead of \$20.80 as "New England" puts it. Another error of only \$41.20. If "New England's" figures are equally wrong in other respects, I am afraid his apparent efforts to bolster up the Hartford wheel will not amount to much.

Then again he says: "It is contended that it is unsafe to use any but soft steel, owing to the pressure to be sustained." It is contended by whom? Give us the name of the man who would contend a thing of this kind and his reasons for it. I know that the makers do not contend this, for they procure the hardest tire they can get, so long as it is not brittle—at least they so inform us. They do not claim that the tire should necessarily be as tough as would be required upon an iron centre; but they do want it hard.

I will not enter into the question of service at this time, but can, and will, at some future time give you some figures on the service of paper wheels that will astonish "New England," and cause the public to think that there is something wrong with his trucks if he can get only the small service he claims.

May I not also ask if there is not an error in the editorial foot-note where you give the figures on Pullman service. Should it not be hundred thousands instead of thousands?

FAIR PLAY.

Car Ventilation.

NEW YORK, Feb. 1, 1883.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your admirable article on "The Ventilation of Railroad Cars" in the *Railroad Gazette* of Jan. 12 is, in the main, well worth a careful perusal, and I trust will be, or has been, carefully read, and I also trust the following criticism will also be as carefully considered:

The subject of car ventilation is, as you say, always in order, and it certainly is one vitally connected with public health; but the unparalleled amount of stupidity, obstinacy, ignorance and prejudice, etc., connected with the subject is something appalling. The time will come, however, when this matter will be handled intelligently and practically by railroad officers, train conductors and brakemen.

The best system that mechanical ingenuity can devise will be inoperative unless there is some little intelligence in its management. Your illustration of getting the whiskey out

of the barrel without the vent hole is particularly good, but some persons go a good deal farther, and in the case of the Delaware, Lackawanna & Western Railroad Company, to which you refer, I think you are one of the number. If, instead of condemning in unmeasured terms the system, you had looked a little into the appliances provided, perhaps you would have thought differently. In the case you refer to the car-builder had done his duty, as ample provision was made to admit an abundant supply of air at the frieze, and as ample provision for its exhaust at the clear-story. In addition there were tipping sashes between the exhaust ventilators; these last possibly were open and possibly not. The registers connected with the ventilators in all probability were all closed, and in a climate like ours it is absolutely necessary that a large proportion of them must be at times open. It is impossible in this latitude that any system of ventilation can be entirely self-operating. The fact that the system in use on the Delaware, Lackawanna & Western Railroad is so nearly so is perhaps the reason why you found the ventilation imperfect on the occasion you refer to. If four or five of the exhaust ventilators on each side of the clear-story had been open and as many more in the frieze, the air would have been faultless; that they were not was not the fault of the builder. It is perfectly true that conductors or brakemen should understand the subject, and make the proper adjustment of the appliances furnished, as the average passenger does not wish to make himself conspicuous by a proper arrangement of the ventilators; he might as well be expected to adjust the lamps or take care of the fires in the stoves. The system of deflecting the sashes in the clear-story which you refer to on the Pennsylvania Railroad certainly answers the purpose as an exhaust, but it requires much attention, and it gets it on that line, as the brakemen are instructed to attend to it; but even it has some objections: sometimes the changing of the deflectors is forgotten when the direction of the train is reversed, and the car is then filled with smoke, and when the wind happens to be blowing hard in the direction the train is moving (as it will sometimes) and the train stops, a hurricane of cold air rushes down on the heads of the passengers. The long handles necessary to the manipulation of the sashes are no special ornament to the car, and the whole arrangement is just as expensive and not a whit more effective than that used by the Delaware, Lackawanna & Western Railroad.

Now a word about end ventilation. I quite agree with you on the necessity and advantage of it; no system of exhaust of any kind will work well without it or its equivalent. The bad air cannot be got out of a car unless provision is made for the admission of fresh air any more than the whiskey can be got out of a barrel without the vent to supply its place; but just how to get the air in the end is or has been the problem. The open sash will not do, nor the opening in the clear-story over the platform. The system first adopted on the New York Central Railroad within a year or two, and now on many other roads, of making openings over the end windows about 8 in. high and 24 in. wide has proved a success. On the outside the opening is covered with a perforated plate, and each of these perforations is protected by lipped coverings that project the incoming air upward and prevents the passengers from seeing that there is any opening. By this simple arrangement there can be a free inflow of air all the time without the violent drafts consequent upon open sashes, and what is of more importance indeed, without the knowledge of the passengers sitting near the end of the car. This arrangement with the same system of exhaust at the clear-story as used by the Delaware, Lackawanna & Western Railroad, and with a very small amount of attention, will secure absolutely perfect ventilation with the simplest and cheapest mechanism possible, and needs only to be applied and intelligently managed to secure the best possible results.

The ventilation of cars is a necessity the year round, independent of the heating appliances. In the spring or summer, when no fires are needed, no one likes an open window in the night, however pleasant it may be in the daytime. Hence I plead for perfect ventilation independent of the heating appliances; and perfect ventilation being provided, the heating appliances will be all the more aided and perfected in their operation by it. That there are cars running, and thousands of them too, with no system of ventilation worth the name, is notoriously true. The builders—assuming that a superabundance of gilding, plating, upholstering, paint and varnish will take the place of ventilation—this, together with a desire perhaps to keep all air out of the car, thus avoiding dust and cinders, is perhaps the reason. About the easiest thing to do in the everyday problems of life, in my judgment, is to ventilate a railway car.

Now in conclusion, Mr. Editor, let me ask of you that the next time you ride in a Delaware, Lackawanna & Western Railroad car, or any other, and find the air bad, look around you and see if the appliances provided by the car builder are so adjusted as to secure ventilation. You may possibly find the end sashes (which you recommend so strongly) closed tight, even with the notice posted over them, "If you want pure air keep this ventilator open." Depend upon it, the fault is sometimes with the engineer and not always with the engine. Yours for **PURE AIR.**

The Education of Engineers.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your article in the *Railroad Gazette* of Jan. 26, on the "Education of Engineers," I have read with much interest and with much profit—and yet it reminds me of a young man who, wishing to raise asparagus, applied to a celebrated horticulturist for directions as to how he should proceed, and

was advised to get a spade. The advice was excellent as far it went, but he felt it rather vague.

It is indeed most useful to dig into the soil of other men's minds so as "to get the full benefit of other men's minds and experience," but the young engineer may well ask how he, in distinction from other workers, is to apply his spade. We are considering education not in its general bearings but with the definite aim of making a man an engineer.

A young man wishing to be an engineer should make himself perfectly familiar with the use of figures; should understand geometry and trigonometry, and should be sufficiently conversant with algebra to use it as a mode of reasoning. He should also read a clear and comprehensive treatise on the relation of forces.

So prepared, let him apply himself to the careful study and consideration of the best existing instances of engineering, such as Mr. Hartley's bridge over the Dee, the suspension bridge of the late Mr. Roebling at Cincinnati, or the tunnel through Mount St. Gothard.

Instead of theorizing how a thing should or might be done, let him study it as it is done. Let him put clearly before himself what the engineer had to do, and then learn clearly how he did it.

The intelligent study of what has been already achieved in engineering—the study, not in theory but in the practical working of the many devices and contrivances by which the ablest minds of the profession have fulfilled the various tasks committed to them, a study which will give a clear comprehension of and thorough familiarity with these achievements—such, we repeat, should be the aim of the education of the young engineer.

It is, moreover, to be remembered that this study of the works of other men is by no means to lead to a blind imitation of them. Let the young engineer study them thoroughly with all their attendant circumstances, so that he clearly understands what the problem was the engineer had to solve and the means by which he has done so. The probability is that in nine cases out of ten the engineer whose work is being studied was a man of greater powers of mind than the student possesses. Minds capable of originating an idea—capable of invention are rare. And many a man makes a useful engineer who possesses the inventive faculty in but a small degree.

Many of the tasks which are intrusted to the engineer are not novel—they are in the main what has been successfully accomplished again and again; and it is by careful study of this work that the young engineer will learn how these tasks were fulfilled. In the demands which will in the future be made upon the rising engineer, it is not requisite that the work he will do should be novel, but it is requisite that it should be as well done as the present state of knowledge in the world makes possible.

There is no fear that this course of proceeding will give no scope for a man's originality. No one piece of work laid before an engineer can ever in every particular be identical with any other. In any work which an engineer may have to do he should always consider the special circumstances of the individual case before him, and should be guided not by blind imitation of what his predecessors have done, but by his own judgment of what is the best mode of accomplishing what he wishes to do. And his judgment will be most fitted to make that decision wisely when it has been made thoroughly conversant with the existing modes which experience have proved successful.

We have said that many a useful engineer has had but a small degree of the inventive faculty, but intelligence he must have. The man who is incapable of making discriminating use of the teachings of others need never imagine that his own unguided power of invention will enable him to excel them.

Using his judgment in the way above mentioned, an engineer will have ample opportunity for using whatever powers of invention he may possess, and in so doing he must necessarily incur the trials and uncertainties by which all experiments and innovations are attended. The benefit which the world has received from such experiments and innovations is incalculable, and the inevitably attendant loss in time, thought and money before the successful result can be obtained is by no means to be mentioned in comparison to it; indeed no advance in science is possible without such experiments. But by the study of the labors of his predecessors a man may keep this loss at its minimum, preventing a waste of time and thought in attempting that which has been proved to be impossible or which would only lead to results that have been already attained.

We have been considering the case of the majority of young engineers, but supposing a young man, whose education is the matter under discussion, to be the one out of ten, to be the one with the faculty of inventing, of originating, still the same course will hold good, and will prove to be the best mode of education for him as for the majority.

There is no mode of education whatever which will produce the originating faculty in a man's mind. It is the life-germ which, once existing, can be cultivated, but which can never be created where it does not exist.

Disraeli has said, "If our energy and our experience were twins, we would be gods." Each man has but a certain limited degree of power or force of exertion, whether physical or mental. Too often he expends this force so ignorantly that by the time he has learned by experience how he can use it to effective purpose, he has no more force to use. It is for education to make such a waste of the powers as little as possible, by enabling the individual to take advantage of the experience of many generations. The education of the engineer should be such as will put him in possession of all the labors of the past, so that whatever of thought, of inventive faculty, of powers of achievement he may possess,

*The article referred to is the paper by Mr. A. L. Rotch, read before a society of the Massachusetts Institute of Technology, and published in our issue of Dec. 22 last, page 786.—EDITOR.

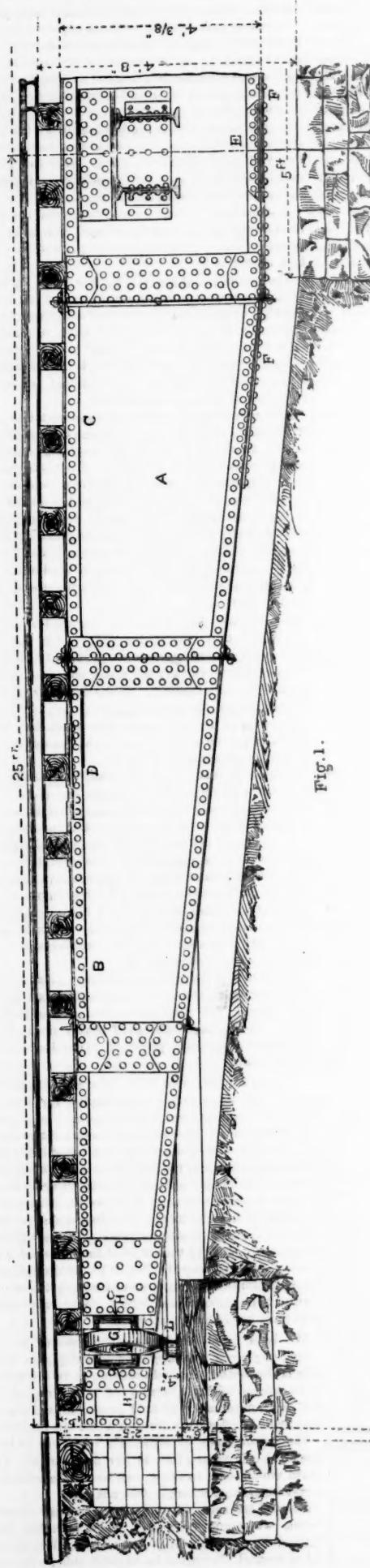


Fig. 1.

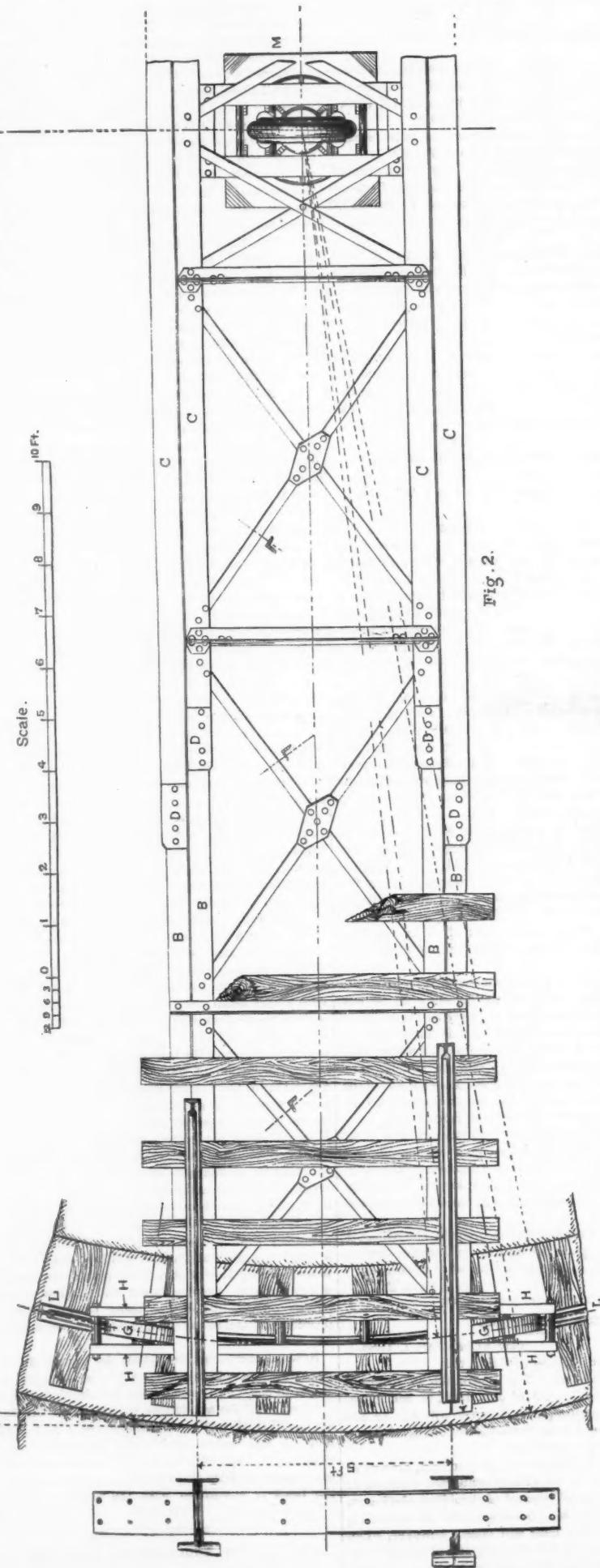
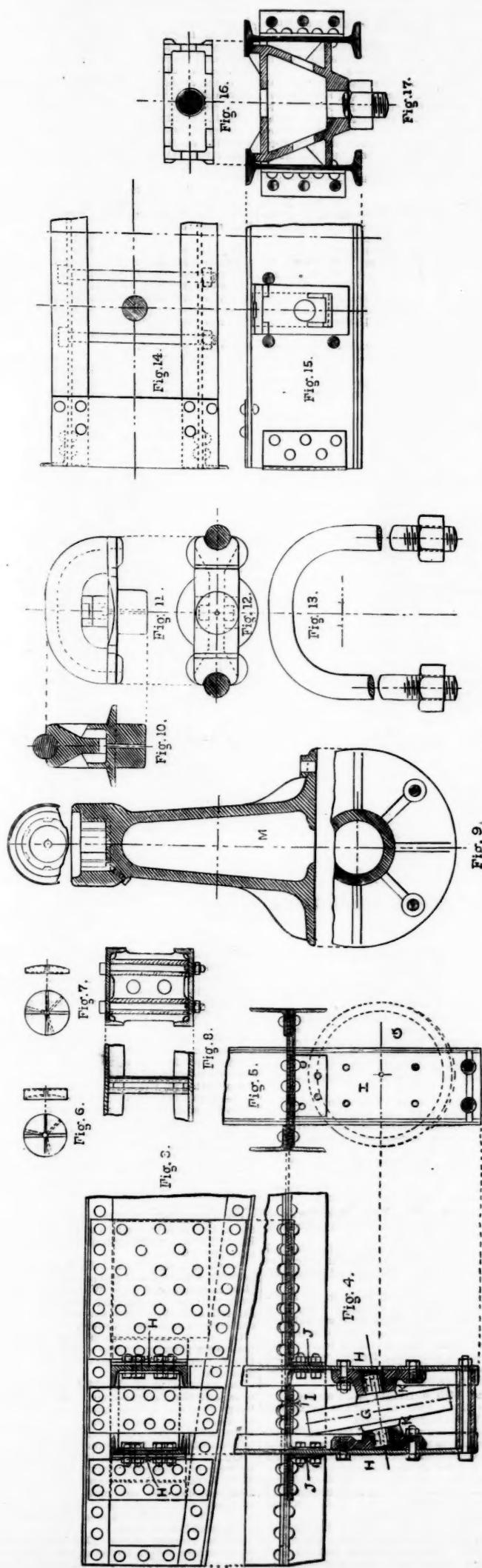


Fig. 2.

FRITZSCHE'S TURN-TABLE.



DETAILS OF FRITZSCHE'S TURN-TABLE.

may be to the advantage and advancement of the science he is engaged in, and not as mere doing again of what has been done before.

This may at a first glance seem to contradict what has been said before of the unimportance of novelty. But it is only at a first glance that there is any such contradiction. It is not the novelty that is in any way to be desired, it is the obtaining of the best possible mode of doing the work. If after due consideration of existing modes the engineer can devise better modes of his own for doing the work, *by all means* let him do so. But until he has studied what has already been done the probabilities are that his work will be novel in its inferiority only.

Do not let the young spend their time in making stepping-stones across the sloughs of ignorance where other men have already made firm bridges over which they may pass with little labor. There are those who will tell you that the hewing of the rock to form these stepping-stones will develop the muscles in a most desirable manner. Surely the path of science has not yet reached so far but that its extension will furnish abundant opportunities for developing the muscles of the mind.

It should be the part of education to put the student as far as possible on this path, that all his efforts in advance may be an advance also to the world.

And to the young engineer in especial is it desirable to have a thorough knowledge of what has been already done in his own calling. In the arts, in poetry or music, it may be otherwise. There, genius may spread its wings and soar at once to its greatest heights, but the sciences must progress with feet on the material earth.

ONE WHO WAS BROUGHT UP BY AN ENGINEER.

Fritzsch's Turn-Table.

The turn-table illustrated by our engravings has been patented by Mr. C. O. H. Fritzsch, whose address is No. 73 Broadway, New York, and a number of them have been constructed for the New York, West Shore & Buffalo, the New York City & Northern, the Connecticut River, the Bangor & Portland, the Carolina Central, the Western Railroad of Cuba and other roads. In designing this structure, the strength of all the parts has been carefully calculated and proportioned for the maximum moving loads which each must sustain. At the same time, the designer has aimed to simplify the construction and arrangement of the parts so that the least amount of material and cost of construction, both for the iron work and masonry, will be required for a turn table with the amount of strength and stiffness which this one has, and with a factor of safety of four or over.

It consists of two main wrought-iron plate girders with angle-iron top and bottom flanges connected together with transverse bracing. Fig. 1 is a side view of one-half of the table, fig. 2 a plan. Figs. 3 to 18 show the details of construction. Figs. 18 and 19 show the centre bearing or pivot. Fig. 18 represents a transverse section of the girders and an external view of the pivot. Fig. 19 is a section of the pivot cut longitudinally to the girders.

The main girders *A*, as stated, are made of plate iron, with angle-iron top and bottom flanges, as shown in figs. 1, 2 and 18. The top flanges consist of two pieces of angle iron, *B* and *C*, figs. 1 and 2. The flanges of the central pieces *C* are wider than those of the outer pieces *B*, in order to provide for the greater strain on the girder in the centre. The two lengths butt up against each other at *D D*, and are spliced at those points with covering plates on top and a splice-bar of angle iron underneath. With this form of construction it is claimed that the loss of effective cross section of the material due to rivet holes is reduced to a minimum.

The lower flanges are made in two pieces of angle iron spliced at the centre *E*. They also have an extra plate *FF* in the middle and riveted under the angle iron, as shown in figs. 1 and 18.

The cross ties rest on top of the girders, as shown in figs. 1 and 2. The horizontal cross-bracing is shown clearly in fig. 2, and requires no explanation.

The outside carrying wheels *G' G'*, figs. 1, 2, 4 and 5, are attached, at each end of the girders, to a pair of channel bars *H H*, which extend through the main girders and are fastened to it with angle irons, as shown clearly in the sectional plan, fig. 4, from which it will be seen that a U-shaped angle-iron *I* is placed between the channel bars *H H* and riveted to them and to the plate of the main girder. On the outside of the channel bars there are angle-irons *J J* also riveted to the channel bars and to the main girders. On the inside of the channel bars the bearings *K K* for the axles of the carrying wheels *C C* are bolted. This form of construction permits the centres of the carrying wheels to be raised to the middle of the height of the main girders, and the diameter of the wheels can be thus increased, and still keep the lower edges of the girders near the circular track *L L*. An easy movement of the turn-table is thus secured, and in case the carrying wheels should get off the rail, the girders can fall only a short distance, and therefore can easily be replaced. Furthermore, raising up the carrying wheels reduces the depth of the pit, which results in a saving of labor and mason work in putting down the turn-table.

The arrangement of the channel-bars and of the transverse bracing gives a very substantial and rigid connection of the two main girders.

The bearing step for the centre pivot consists of a hollow cast-iron post *M*, figs. 10, 19 and 20, resting on a stone foundation. In the top it has a cylindrical cavity *a*, which receives a similarly shaped centre pin or pivot *b*. This has an oval-shaped head *d*, with a semi-circular groove *e*, fig. 19, and with openings *f f*, through which oil can be introduced,

a central channel *g* being provided, through which the oil passes down to the bottom of the step *h* in the cavity *a*.

The centre pin fits the cavity of the step, and in the sides of this cavity are recesses *i* to allow the oil to rise and to distribute itself over the entire bearing-surface of the centre pin. On the bottom of the step *b* are placed two disks *j a*, detached views of which are shown in figs. 6 and 7. One of these disks has a concave and the other a convex surface, to be placed against each other, and both surfaces of each disk are grooved, so that the lubricating material can readily distribute itself. These disks are made of steel. The centre pin *b* is connected to the turn-table by a yoke *N N*, which fits the semi-circular groove *e*, and the shanks of which extend down through blocks *O O*, which are situated on opposite sides of the post *M* and fits between transverse girders *P P*, fig. 18. When the nuts *l* on the shanks of the yoke *N* are drawn up tight, the blocks *O* bear against the top flanges of the transverse girders, and the centre pin *b* is held down firmly on the disks in the cavity of the step *a*. The transverse girders *P* are secured to the main girders *A A* by angle-irons *m*, or by any other suitable means.

By the use of the yoke the number of suspension points for the entire weight of the turn-table and its load is reduced to two, and at the same time the centre connections are firm and durable, thereby insuring an easy action on the centre pin.

Further information concerning this turn-table will be given by the patentee, whose address will be found above.

Pa., the switch was not turned quickly enough, and the cars ran into the engine, doing some damage.

Early on the morning of the 7th a freight train on the New York Central & Hudson River road ran into some cars which had broken loose from a preceding freight near Memphis, N. Y., wrecking several cars.

A few minutes later a third freight train came up and ran into the second, wrecking more cars and throwing two of them over upon the adjoining passenger track.

A few minutes later a passenger train came up and ran into the wrecked cars on its track, completing their destruction and making a very complicated and troublesome wreck.

On the morning of the 7th when a passenger train on the Boston & Albany road was cut in two to run into the station at Springfield, Mass., on separate tracks, the bell rope was not unhooked, and the engineer, hearing the gong sound, stopped his train short, when the detached section ran into it, damaging several cars and injuring a passenger slightly.

On the night of the 7th a freight train on the New York Central & Hudson River road ran into the rear of a preceding freight near Savannah, N. Y., wrecking several cars. There was a blinding snow storm at the time.

On the morning of the 8th a freight train on the Missouri, Kansas & Texas road backed into another freight train on a siding in Waco, Tex. Both cabooses were wrecked and five trainmen hurt.

On the evening of the 8th a passenger train on the Manhattan Elevated road ran over a misplaced switch and into another train standing on a siding at the Battery station in New York. Both engines were damaged.

On the evening of the 8th a passenger train on the Louisville & Nashville road ran into the rear of a freight at Fowl River, Ala., damaging several cars.

On the evening of the 10th a passenger train on the Geneva, Ithaca & Sayre road ran over a misplaced switch

Vermont road ran into the rear of another freight in Colchester, Vt., damaging several cars.

On the night of the 19th a freight train on the Cincinnati, Indianapolis, St. Louis & Chicago road ran into a preceding freight near Shelbyville, Ind., damaging the caboose.

On the morning of the 20th a freight train on the Indiana, Bloomington & Western road broke in two near Montezuma, Ind., and the rear section ran into the forward one, wrecking several cars.

On the evening of the 20th a wild engine on the Chicago, Milwaukee & St. Paul road ran into the rear of a freight train near Milwaukee, Wis., damaging the caboose.

On the evening of the 21st a freight train on the New York Central & Hudson River road ran into a helping engine standing on the track in Lyons, N. Y. The tender of the helper was damaged, and the jar started the engine off with no one on board, causing another collision a few minutes later.

On the night of the 22d a freight train on the Pennsylvania Railroad ran into a preceding freight near Rohrersburg, Pa., in a heavy fog. Seven cars were wrecked and a trainman hurt.

BUTTING COLLISIONS.

On the night of the 1st there was a butting collision between a passenger and a freight train on the Kentucky Central road near Flemington, Ky. Both engines and several cars were wrecked, an engineer and a fireman killed and two other trainmen and a passenger hurt.

On the morning of the 5th there was a butting collision between two freight trains on the Chicago & Grand Trunk road near Charlotte, Mich. Both engines were damaged and a fireman hurt.

On the afternoon of the 7th there was a butting collision between a freight and a passenger train on the Chesapeake & Ohio road near the entrance to Stretcher's Neck tunnel. Both engines, two passenger and five freight cars were piled

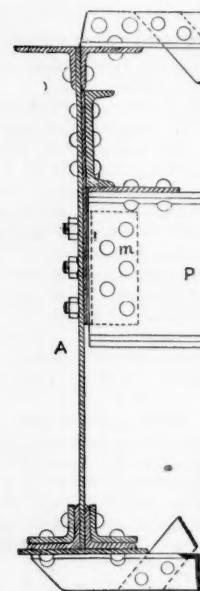


Fig. 18.

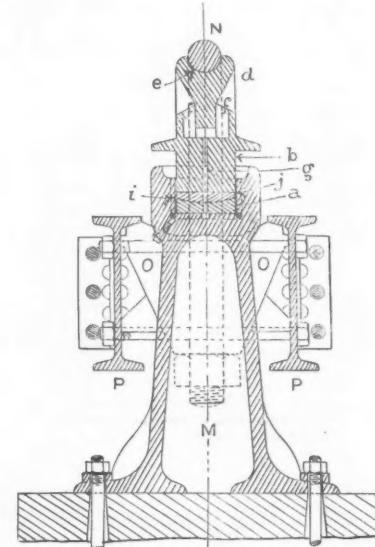


Fig. 19.

DETAILS OF FRITZSCHE'S TURN-TABLE.

Train Accidents in December.

The following accidents are included in our record for the month of December :

REAR COLLISIONS.

On the morning of the 1st a freight train on the Cleveland & Pittsburgh road ran into a preceding freight near Rochester, Pa., damaging three cars.

On the evening of the 1st a passenger train on the Manhattan Elevated road ran into the rear of a preceding train at the Fifty-ninth street station in New York, doing some damage.

On the night of the 2d a freight train on the Pittsburgh, Cincinnati & St. Louis road ran into some cars which had broken loose from a preceding freight near Burgettstown, O. The engine and several cars were damaged and three trainmen were hurt.

On the night of the 3d a freight train on the Pittsburgh, Ft. Wayne & Chicago road ran into a preceding freight near Lucas, O., damaging an engine and several cars and killing the engineer.

Very early on the morning of the 5th a passenger train on the Pennsylvania & New York road ran over a misplaced switch and into the head of a freight train which was standing at Rutherford, Pa., waiting for the express to pass. The switchman had signaled the passenger train to come on, that all was right. The passenger engine mounted on the top of the freight engine and both went over together, the baggage and mail cars piling up on top of the tender. The fireman of the freight was caught under the engine and instantly killed; the engineer had a leg pinned fast under the engine, and as the wreck caught fire, he called to those around him for help. Every effort was made to save him, but the fire spread very fast, burning up the cab and wood-work of the engine, and the trainmen and passengers were compelled to stand by and see him burn to death. He met his fate with great courage, and seemed to realize that his rescue was impossible.

On the morning of the 5th a freight train on the Central Pacific road broke in two near Martinez, Cal., and the rear section ran into the forward one, piling up 18 cars in a bad wreck.

On the night of the 6th a freight train on the Evansville & Terre Haute road broke in two near Cynthiana, Ind., and the rear section ran into the forward one, wrecking several cars.

On the night of the 6th a freight train on the Central Railroad of New Jersey ran into the rear of a preceding freight near Phillipsburg, N. J., piling up a number of cars in a bad wreck. The fireman was hurt.

On the night of the 6th a freight train on the Indianapolis & St. Louis ran into a preceding freight at Coulogue, Ill., wrecking several cars.

On the night of the 6th, as a freight train on the Lehigh Valley road was making a flying switch at South Easton,

and into some passenger cars on a siding in Lyons, N. Y. The engine and a car were badly broken.

On the night of the 11th a freight train on the Chicago & Northwestern road ran into another freight on a siding in Waukegan, Ill., damaging several cars.

Near midnight on the 11th a freight train on the Chicago & Northwestern road ran into a preceding freight, which had been stopped by a signal from still another freight which was stalled on a grade near Devil's Nose, Wis. The third train was following the second so closely that it could not be stopped.

On the morning of the 12th a freight train on the Pittsburgh, Cincinnati & St. Louis road ran over a misplaced switch and into another freight standing on a siding at Urbana, O. Both engines and several cars were badly broken and a brakeman was hurt.

On the morning of the 12th a passenger train on the Western & Atlantic road ran over a misplaced switch and into some freight cars on a siding in Kingston, Ga. The engine and a car were damaged and the engineer was hurt.

On the evening of the 12th a freight train on the Lake Shore & Michigan Southern road ran into a preceding freight at Norfolk, N. C., wrecking four cars.

On the morning of the 13th a freight train on the Central Railroad of Georgia ran into a preceding freight near Savannah, Ga., wrecking three cars. No flag had been sent back.

On the morning of the 13th a freight train on the Baltimore & Ohio road ran into the rear of a ballast train on a curve near Ellicott City, Md. The engine and several cars were wrecked and the engineer and fireman badly scalded.

Early on the morning of the 14th a freight train on the Grand Trunk road ran into a preceding freight, which had stopped at Stratford Hollow, N. H. The engine and several cars were wrecked and two trainmen hurt.

On the morning of the 14th a freight train on the New York Central & Hudson River road ran into a preceding freight near Crafts, N. Y., damaging 20 cars.

On the night of the 14th a snow-plow and two engines on the Grand Trunk road ran into the rear of a passenger train near London, Ont. An engine and a car were damaged, an engineer and a fireman killed and five passengers hurt.

On the morning of the 15th a freight train on the Sullivan County road ran over a misplaced switch and into another freight standing on a siding in Charlestown, N. H., damaging several cars and injuring two brakemen.

About noon on the 15th a freight train on the Troy & Boston road ran into the rear of another freight which had stopped near Melrose, N. Y., and the engine and 35 cars were piled up in a very bad wreck. One trainman was killed, two fatally injured and two less severely hurt. The coroner's jury found a verdict against the conductor, the train dispatcher and the Superintendent of the road, and they are now under bail awaiting trial.

On the night of the 15th a freight train on the Central

up in a bad wreck. Three trainmen were killed, four trainmen and a passenger hurt.

On the night of the 9th a drunken man got upon an engine standing in the yard at East Syracuse, N. Y., and started it out on the main track. After running a short distance it met a freight train coming in and both engines were wrecked.

On the night of the 9th there was a butting collision between a freight and a passenger train on the New York & New England road at Chewink, Conn. Both engines and several cars were damaged and three trainmen hurt. It is said that the operator at Goshen had orders to stop the freight, but neglected to put out a signal until too late.

On the evening of 11th there was a butting collision between a passenger and a freight train on the Wilmington & Northern road near Chadd's Ford, Pa. Both engines and several cars were damaged and three trainmen hurt. It is said that the freight train was running without orders.

On the evening of the 14th there was a butting collision between two freight trains on the Mobile & Ohio road near Cushing, Ala. Both engines and several cars were wrecked and a trainman killed.

On the night of the 14th there was a butting collision between two freight trains on the Grand Trunk road near Hensall, Ont., wrecking both engines and injuring an engineer and a fireman.

On the morning of the 15th there was a butting collision between a freight and a repair train on the New York & New England road near Waterbury, Conn. Both engines were wrecked, several cars damaged, two trainmen fatally injured and three less severely hurt. The accident was caused by a mistake in orders.

On the afternoon of the 16th there was a butting collision between a passenger train and a yard engine on the Union Depot tracks in Indianapolis, Ind. Both engines were damaged.

On the evening of the 16th there was a butting collision between a through passenger train on the Rochester & Pittsburgh road and a local passenger train (which was running backward) near Salamanca, N. Y. An engine and one car were badly broken, the engineer and three passengers hurt. It is said that the local train was running against orders.

On the morning of the 18th there was a butting collision between two passenger trains on the Pittsburgh, Cincinnati & St. Louis road on a sharp curve near Foster's Crossing, O. Both engines and the mail cars were badly wrecked, an engineer and a postal clerk killed and three others slightly hurt. The accident was caused by a mistake of the engineer of the east bound train.

On the evening of the 17th there was a butting collision between two freight trains on the Grand Trunk road, near Riviere Ouelle, P. Q. Both engines and several cars were badly broken.

On the night of the 18th there was a butting collision between a passenger train and a yard engine on the Chicago & West Michigan road in New Buffalo, Mich., damaging both engines.

On the morning of the 19th there was a butting collision between a passenger train and a wild engine on the South-eastern Railway of Canada, near Richelieu, P. Q. Both engines were damaged and an engineer hurt.

On the evening of the 21st there was a butting collision on the New York Central & Hudson River road near Lock Berlin, N. Y., between a freight train and a helping engine which had been started from Lyons with no one on board by another accident a few minutes before and which was then running at great speed. Both engines were completely wrecked, a brakeman killed, an engineer and a fireman hurt.

On the evening of the 21st a ballast train on the New York, Susquehanna & Western road broke in two near Columbia, N. J., and the detached cars ran back down the grade and into the head of a following freight train. The engine and eight cars were badly damaged, the engineer hurt.

On the morning of the 22d there was a butting collision between a passenger train and a yard engine on the New York, New Haven & Hartford road in Bridgeport, Conn. Both engines and several cars were damaged and one passenger hurt. The yard engine was on the main track, although the passenger train was due.

On the afternoon of the 23d there was a butting collision between two freight trains on the Louisville & Nashville road near Holmes' Gap, Tenn. Both engines were badly broken and an engineer hurt.

On the night of the 23d there was a butting collision between two freight trains on the New York, Pennsylvania & Ohio road near Kennedy, Pa. Both engines and several cars were wrecked and a conductor killed. The accident was caused by the failure of an operator to deliver orders.

On the night of the 23d there was a butting collision between a passenger and a freight train on the Wabash, St. Louis & Pacific road near Carpenter, Ill. Both engines were badly broken, an engineer and a conductor killed, three trainmen and six passengers hurt.

Very early on the morning of the 25th there was a butting collision between a passenger and a freight train on the Chesapeake & Ohio road near Millboro, Va. Both engines and the baggage car were wrecked, several other cars damaged, an engineer, two firemen, baggageman, express messenger and a brakeman killed, and a passenger hurt. The passenger train was on time, but it is said that the freight conductor's watch was 35 minutes slow, and he thought he had plenty of time to get to Millboro.

On the afternoon of the 26th there was a butting collision between two freight trains on the New York & New England road, near Mount Bowdoin, Mass. An engine and several cars were damaged.

On the evening of the 27th there was a butting collision between two freight trains on the Chicago & Alton road at Godfrey, Ill. Both engines and several cars were badly damaged.

On the afternoon of the 30th there was a butting collision between a freight and a wrecking train on the New York & New England road near Olneyville, R. I. Both engines were badly damaged and five trainmen hurt. The operator at Olneyville had been ordered to hold the freight, but failed to do it.

CROSSING COLLISIONS.

On the morning of the 8th a Chicago, Burlington & Quincy freight ran into a Union Pacific freight at the crossing in Omaha, Neb., wrecking several cars.

On the afternoon of the 11th a Pittsburgh, Cincinnati & St. Louis freight ran into an Ohio Southern freight at the crossing in South Charleston, O., wrecking several cars. The Pan Handle engine broke loose and ran off with no one on board, running 10 miles before it stopped.

DERAILMENTS, BROKEN RAIL.

On the afternoon of the 1st two cars of a passenger train were thrown off the track and down a bank near Tipton, Tenn., on the Chesapeake, Ohio & Southwestern road, injuring 30 persons slightly. The accident was caused by a broken rail.

On the morning of the 4th several cars of a freight train on the Central Railroad of Georgia, were thrown from the track near Fort Valley, Ga., by a broken rail.

Early on the morning of the 9th a passenger train on the Indiana, Bloomington & Western road was thrown from the track in Indianapolis, Ind., by a broken rail.

On the evening of the 9th several cars of a freight train on the Pennsylvania Railroad were thrown from the track near Johnstown, Pa., by a broken rail.

On the evening of the 9th a passenger train on the Silver Lake road struck a broken rail near Walkers, N. Y., and a passenger car was thrown from the track and rolled down a high bank. The conductor, brakeman and six passengers were hurt, two of them seriously.

On the morning of the 13th a freight train on the Chicago, Milwaukee & St. Paul road struck a broken rail near Oakwood, Wis., and 12 cars were thrown from the track.

On the night of the 16th a passenger train on the Wabash, St. Louis & Pacific road struck a broken rail near Woodburn, Ind., and four cars were thrown into the ditch and badly broken. The conductor and four passengers were hurt.

On the morning of the 18th a freight train on the Philadelphia & Reading road struck a broken rail near Gilberton, Pa., and nine cars were thrown from the track and badly broken.

On the night of the 19th a passenger train on the South Carolina road struck a broken rail near Aiken, S. C., and one car was thrown from the track, injuring two passengers slightly.

On the evening of the 21st a passenger train on the Wabash, St. Louis & Pacific road struck a broken rail near Antwerp, O., and three cars were thrown from the track, injuring three passengers slightly.

On the morning of the 22d a passenger train on the Ft. Wayne, Cincinnati & Louisville road struck a broken rail near Connersville, Ind., and a car was thrown from the track and down a bank into the canal. Three passengers were badly injured and seven slightly hurt.

On the afternoon of the 25th a car of a passenger train on the Chicago, St. Paul, Minneapolis & Omaha road was thrown from the track near Gordon, Wis., by a broken rail. The conductor was hurt.

DERAILMENT, BROKEN SWITCH ROD.

On the afternoon of the 15th a passenger train on the New York, Ontario & Western road was thrown from the track by the breaking of a switch rod at Whirling Eddy, N. Y. The tender was thrown over against a car on a siding and the baggage car rolled down a bank. Two trainmen were hurt.

DERAILMENTS, BROKEN BRIDGE.

On the afternoon of the 9th a bridge on the Chicago & Northwestern road near Moingona, Ia., gave way under a freight train and 16 cars went down into the river.

On the morning of the 26th a bridge on the Evansville & Terre Haute road near Vincennes, Ind., gave way under a freight train, and five cars went down and were wrecked.

On the morning of the 29th a yard engine on the Philadelphia & Reading road broke through a trestle on a coal siding in Pottstown, Pa., and fell 14 ft. to the ground. The

engine was wrecked, the engineer and fireman badly hurt. The trestle belonged to the Pottstown Iron Co., and not to the railroad.

DERAILMENTS, SPREADING OF RAIL.

On the afternoon of the 2d a car of a passenger train on the Chesapeake, Ohio & Southwestern road was thrown from the track in Memphis, Tenn., by the spreading of the rails. A woman who tried to jump was killed.

On the night of the 7th a passenger train on the St. Louis, Iron Mountain & Southern road was thrown from the track near Camden, Ark., by the spreading of the rails. Three cars were badly damaged, and five passengers hurt.

On the morning of the 10th several cars of a freight train on the Chicago & Northwestern road were thrown from the track at Eden, Wis., by the spreading of the rails.

On the afternoon of the 13th two cars of a freight train on the New York Central and Hudson River road were thrown from the track in Rochester, N. Y., by the spreading of the rails.

On the morning of the 14th the engine of a passenger train on the New York Central & Hudson River road was thrown from the track at Clifton Springs, N. Y., by the spreading of the rails.

On the morning of the 13th 20 cars of a freight train on the Philadelphia & Reading Road were thrown from the track in Gilberton, Pa., by the spreading of the rails, and piled up in a bad wreck.

On the 19th eight cars of a freight train on the Allegheny Valley Road were thrown from the track at Pattons, Pa., by the spreading of the rails.

On the morning of the 22d a passenger train on the New York, Lake Erie & Western Road ran off the track on a trestle near Carrollton, N. Y. A car was badly damaged, a stringer of the trestle being forced up through the floor; the conductor, brakeman and four passengers were badly hurt. The accident was caused by the spreading of the rails.

On the morning of the 23d six cars of a freight train on the East Tennessee, Virginia & Georgia Road were thrown from the track near Rockmart, Ga., by the spreading of the rails. The cars were wrecked, a brakeman killed and the conductor hurt.

On the afternoon of the 23d a passenger train on the Missouri Pacific Road was thrown from the track near Atchison, Kan., by the spreading of the rails. Two cars upset and five passengers were slight hurt.

On the morning of the 25th five cars of a freight train on the Oregon & California Road were thrown from the track near Albany, Or., by the spreading of the rails.

DERAILMENTS, BROKEN WHEEL.

On the afternoon of the 12th a wheel broke under a car of a freight train on the New York, Lake Erie & Western road near Olentkill, N. Y., and 13 cars were piled up in a bad wreck, blocking the road seven hours.

On the afternoon of the 20th a passenger train on the Louisville & Nashville road was thrown from the track near Soelbyville, Ky., by a broken wheel.

On the night of the 29th the rear car of a passenger train on the Lake Erie & Western road was thrown from the track in LaFayette, Ind., by a broken wheel. The car upset and was badly broken, and the wreck caught fire, but the fire was put out by the trainmen. There were 17 passengers hurt, most of them slightly.

On the evening of the 30th a passenger train on the Chicago, Milwaukee & St. Paul road was thrown from the track near Malvina, Wis., by a broken wheel. Two cars went down a bank and were badly broken; one of them caught fire and was destroyed. Eleven passengers were badly hurt, besides several slightly bruised.

DERAILMENTS, BROKEN AXLE.

Very early on the morning of the 7th several cars of a coal train on the Lehigh Valley road were thrown from the track near Phillipsburg, N. J., by a broken axle.

On the night of the 19th four cars of a freight train on the Indiana, Bloomington & Western road were thrown from the track near West River Summit, Ind., by a broken axle.

On the morning of the 28th four cars of a freight train on the Central Railroad of New Jersey were thrown from the track near Cranford, N. J., by a broken axle.

DERAILMENT, BROKEN TRUCK.

On the evening of the 3d several cars of a freight train on the Missouri, Kansas & Texas road were thrown from the track near Alvarado, Tex., by a broken truck.

DERAILMENTS, LAND-SLIDES AND WASHOUTS.

On the night of the 4th a freight train on the New York Central & Hudson River road ran into a washed-out culvert in Brighton, N. Y., and seven cars were wrecked. The washout was caused by malicious persons opening a gate in the canal close by.

On the night of the 18th a passenger train on the Northern Pacific road ran into a land-slide near Rock Island, Idaho, and the engine and four cars were badly damaged, being thrown from the track.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the night of the 25th five cars of a freight train on the New York Central & Hudson River road were thrown from the track in Rochester, N. Y., by the breaking of a draw-head, which dropped down on the rails.

On the afternoon of the 30th as a freight train on the New York & New England road was near Sterling, Conn., the drum or reservoir of the air brake on the engine fell down on the track, throwing off the tender and five cars, which were piled up in a bad wreck.

DERAILMENTS, CATTLE.

On the morning of the 14th as a freight train on the St. Louis, Iron Mountain & Southern road was going up the Poplar street track in St. Louis, 14 cars broke loose and ran back down the grade. After running some distance they struck a team crossing the road and seven cars were thrown from the track and scattered over the street, one of them knocking down the front of a house.

DERAILMENTS, MISPLACED SWITCH.

On the morning of the 1st the engine and 10 cars of a freight train on the New York, New Haven & Hartford road were thrown from the track at Portchester, N. Y., by a misplaced switch.

On the afternoon of the 4th a passenger train on the Utica & Black River road was thrown from the track in Morristown, N. Y., by a misplaced switch.

On the night of the 6th the engine and 20 cars of a coal train on the Lehigh Valley road were thrown from the track at Coplay, Pa., by a misplaced switch. The fireman was hurt.

On the morning of the 10th a passenger train on the Alexandria & Fredericksburg road was thrown from the track near Alexandria, Va., by a misplaced switch.

On the morning of the 15th five cars of a freight train on the Kansas City, Lawrence & Southern Kansas road were thrown from the track near Chanute, Kan., by a misplaced switch.

On the night of the 15th the engine of a freight train on

the Genesee Valley road was thrown from the track in Rochester, N. Y., by a misplaced switch.

On the evening of the 23d a passenger train on the Cleveland, Akron & Columbus road was thrown from the track in Mt. Vernon, O., by a misplaced switch.

On the evening of the 24th the engine of a passenger train on the Cincinnati, Indianapolis, St. Louis & Chicago road was thrown from the track in Indianapolis, Ind., by a misplaced switch.

On the morning of the 25th the engine of a passenger train on the Central Railroad of Georgia, was thrown from the track in Atlanta, Ga., by a misplaced switch, blocking the road three hours.

A few minutes later the engine of a passenger train on the Western & Atlantic road was thrown from the track by a misplaced switch also, the tracks being there parallel, and the two engines not 30 ft. apart.

On the morning of the 30th a freight train on the Boston, Hoosac Tunnel and Western road was thrown from the track at Schaghticoke, N. Y., by a misplaced switch, and the engine went down a bank into the Hoosick River.

Very early on the morning of the 30th the engine and 15 cars of a freight train on the New York, Lake Erie & Western road were thrown from the track at Greycourt, N. Y., by a misplaced switch.

MISCELLANEOUS DERAILMENTS.

On the afternoon of the 11th a coal train on the New York, Susquehanna & Western road was thrown from the track on the high trestle at West End, N. J., where some section men had taken out a rail and neglected to put out a flag. The engine left the track and the shock broke down a part of the trestle, so that 10 cars went down and were piled up in a bad wreck.

On the afternoon of the 29th the engine of a freight train on the New York Central & Hudson River road was thrown from the track in Rochester, N. Y., by ice packed down on the rails.

MALICIOUS DERAILMENTS.

Early on the morning of the 4th a passenger train on the Wilmington & Northern road ran over a misplaced switch upon a blind siding at Greenville, Pa. The train ran off the end of the siding and the engine and baggage car went down a bank 26 ft. high and were wrecked. Two trainmen and a passenger were hurt. It was found that the switch lock had been broken and the switch changed during the night, and then fastened by a wedge.

On the night of the 7th the engine of a passenger train on the Charlotte, Columbia & Augusta road was thrown from the track in Charlotte, N. C., by a switch which had been purposely mis-placed.

On the evening of the 9th a passenger train on the Louisville & Nashville road was thrown from the track near Bay St. Louis, Miss., by a misplaced switch. The switch, it is believed, was purposely set wrong.

Early on the morning of the 13th two cars of a coal train on the Illinois & St. Louis road were thrown from the track on a coal spar near Belleville, Ill., by a switch which had been purposely mis-placed and the lock broken. The cars went down a bank and a brakeman was buried under 50 tons of coal and badly hurt.

On the morning of the 17th a passenger train on the Florida Central & Western road was thrown from the track near Lloyd, Fla., by a heavy bar of iron laid across the rails.

UNEXPLAINED DERAILMENTS.

On the morning of the 2d a car of a passenger train on the Chicago & Northwestern road ran off the track near Arlington Heights, Ill., and went down a bank.

On the morning of the 4th the caboose of a freight train on the Savannah, Florida & Western road ran off the track near Thomasville, Ga., and upset, injuring a brakeman and a passenger.

On the evening of the 6th several cars of a freight train on the Erie & Pittsburgh road ran off the track near Girard, Pa., doing some damage.

On the night of the 6th six cars of a freight train on the Pennsylvania Railroad ran off the track near Green Spring, Pa., and were wrecked.

On the evening of the 8th a passenger train on the Central Railroad of Georgia, ran off the track near Georgetown, Ga., and two cars upset, injuring two trainmen and seven passengers.

Near midnight on the 9th several cars of a freight train on the New York Central & Hudson River road ran off the track near Holley, N. Y., blocking the road three hours.

On the morning of the 12th a car of a passenger train ran off the track at Maplewood, N. Y., on the Rochester & Pittsburgh road.

On the afternoon of the 12th the engine of a construction train on the Genesee Valley road ran off the track near Cuba, N. Y., and upset.

On the morning of the 13th several cars of a passenger train on the Cincinnati, Indianapolis, St. Louis & Chicago road ran off the track near Sedansville, O. A brakeman was hurt.

On the afternoon of the 17th two cars of a freight train ran off the track at Woodburn, Tenn., on the Louisville & Nashville road.

On the evening of the 19th the caboose of a freight train on the Cleveland & Pittsburgh road jumped the track near New Philadelphia, O., and rolled over into the ditch, injuring a brakeman fatally, two other employees and a stockman less seriously.

On the evening of the 20th four cars of a passenger train on the New York, Lake Erie & Western road ran off the track at Bucktooth Bridge, N. Y. One car struck the bridge and was badly broken; the conductor and four passengers were hurt.

Very early on the morning of the 22d six cars of a freight train on the Connecticut River road ran off the track near South Vernon, Mass., blocking the road five hours.

On the 26th 15 cars of a freight train on the Wabash, St. Louis & Pacific road were thrown from the track near Carmi, Ill., and several of them went down a high bank.

On the night of the 26th a freight train on the Atlanta & Charlotte Air Line ran off the track on the trestle approach to the Catawba River bridge near Charlotte, N. C. Eight cars went off the trestle, falling 40 ft. to the ground in a bad wreck. A brakeman was hurt.

On the night of the 26th a car of a passenger train on the Cincinnati, Indianapolis, St. Louis & Chicago road ran off the track on a bridge in LaFayette, Ind., but did no serious damage.

On the morning of the 28th several cars of a coal train on the Pennsylvania Railroad ran off the track at Perth Amboy Junction, N. J., blocking the road an hour.

On the night of the 28th a freight train on the New York, Lake Erie & Western road ran off the track near Spring Valley, N. Y., and several cars were wrecked.

BOILER EXPLOSION.

On the evening of the 5th as a local train on the Philadelphia, Wilmington & Baltimore road was leaving Gray's Ferry, Pa., a valve on the back end of the boiler blew out, filling the cab with steam. The engineer and fireman jumped, the former breaking his leg.

On the morning of the 16th the engine of a freight train

on the Cumberland & Pennsylvania road exploded its boiler in Cumberland, Md. The crown sheet was blown out and the engineer, fireman and brakeman badly scalded.

OTHER ACCIDENTS.

On the morning of the 9th the engine of a passenger train on the Northern Pacific road broke a connecting rod when near Ainsworth, Wash. Ter., doing some damage.

On the morning of the 20th a flat car loaded with cotton in a freight train on the Texas & Pacific road caught fire when near Shreveport, La., and was destroyed.

On the afternoon of the 20th the engine of a passenger train on the Junction & Breakwater road broke a tire on a driving wheel when near Milford, Del. The engine did not leave the track, but a piece of the tire was thrown up into the cab, injuring the engineer.

Very early on the morning of the 21st a postal car on a passenger train of the New York Central & Hudson River road caught fire when near Schenectady, N. Y., and was destroyed.

On the morning of the 28th a car loaded with cotton on the New Orleans Pacific road caught fire near Shreveport, La., and five car-loads of cotton were destroyed.

SUMMARY.

This is a total of 148 accidents, in which 29 persons were killed and 209 injured; a daily average of 5 accidents, 1 killed and 7 injured.

Twenty-eight of the killed and 80 of the injured were railroad employés; 1 of the killed and 129 of the injured were passengers or others riding on the trains.

The whole number of casualties was 238, of which 108, or 45.4 per cent., were to employés, and 130, or 54.6 per cent., to passengers. This showing is due to a few accidents in which a large number of passengers received slight injuries.

For the twelve months of 1882 there have been reported 1,364 accidents, in which 380 persons were killed and 1,588 injured; a monthly average of 114 accidents, 32 killed and 132 injured.

The Prussian State Railroads.

A Berlin correspondent of the New York Evening Post, in a letter on this subject, says :

In my opinion there is no doubt that the efficiency of the railroad service will still increase, while the costs of its management must decrease. Thus, the luxury of half-a-dozen or more costly depots in one city, where one would suffice, of hundreds of superfluous officers and clerks, and the nuisance of deadheadism have already been done away with by the government. Free or complimentary tickets are not even issued to the Minister of Public Works and his subordinates; the ministerial councillors and assessors have to pay just as well as any private citizen. For their official trips they can charge the ordinary fare. The squandering of large sums for rich buildings and private offices has been stopped, but the comfort and the ease of the traveling public have rather been enhanced. I have, therefore, never heard of any well-founded complaint; on the contrary, the present system gives full satisfaction as far as the wants of the traveler and of transportation are concerned. The service is prompt and regular, the treatment of the passengers polite and respectful, the forwarding of the freight punctual and strict, while the accommodations, instead of having been curtailed, have been largely extended on the government roads. Thus all apprehensions of a parsimony injurious to the public have proved idle, and continue to be so, the more as it is in the interest of the government, as well as that of any other common carrier, fully to do its duty by attending to the wants of its customers.

As far as I can judge, the system works well. Instead of having centralized the whole business of the government roads, it has decentralized it. Thus the Berlin central railroad department has been relieved of many embarrassing details and a great number of annoying minutiae of the service. The whole Prussian railroad service is now attended to by ten large departments (formerly twenty-one smaller ones), created in the several provinces—viz., at Bromberg, Breslau, Berlin, Magdeburg, Erfurt, Frankfort-on-the-Main, Cologne (two head offices, one of which is for the railroads on the eastern and the other for those on the western side of the Rhine), Elberfeld, and Hanover, which are all independent of the Minister, and need only refer to him in doubtful matters, while all the wants and complaints of the local roads are administered and remedied by the respective provincial departments.

Thus, in theory and in practice, the Prussian government shows its sound judgment in expediting business and in its dealings with the public; but where it is blamable is in the assuming way in which it treats the still surviving small private companies, the infallible superiority with which it answers their demands and complaints and the arrogant tutelage with which it interferes in their affairs. Personally these royal ministers and councillors are perfect gentlemen, able administrators and obliging officers. The same man, however, who in his private affairs exhibits the strictest scrupulousness and integrity, will never hesitate to follow up the position of his government to gain an undue advantage, and will always have a legion of shallow reasons at his disposal to justify his conduct. The Prussian law subjects the private roads to the superintendence of the Minister of Public Works. His ratification is necessary for every cent that is to be spent for improvements, for every sale of goods which has become advisable or necessary and even for the change of any train. There occur daily instances of ministerial interference which come near Turkish justice. One of the smaller eastern roads wished to sell a few locomotives, because they were too heavy for the sandy plain through which they had to pass, and because it could realize a handsome profit by such sale. The Minister, who had previously forced the company to buy these locomotives, refused his consent, as at perhaps not too distant a day they might be used for the transport of troops and heavy ordnance in a war with Russia. The government collects its taxes and imposts from a railroad company just as from any other private citizen; nevertheless, it demands pecuniary sacrifices from it. In another case the Minister refused to pay to a railroad company a certain sum which had been stipulated for a lease which he had given up before its expiration. He pleaded that the company had suffered no actual damages by his breaking the contract, and that he had to save the money due to the company, in the interest of the tax-paying public. The indignation at this outrageous plea was so great that the matter was finally hushed up. Still another case: A large railroad company proposed to buy a smaller line within its territory. The Minister refused his approval, for the reason that competition was the soul of business, and that, consequently, both lines were necessary. A short time after, he himself bought the large company, but now he bleeds the smaller line to death, by withdrawing from it the greater part of its business. While in case of a sale the shareholders would

have got at least 25 per cent., if not more, of their capital, they now lose everything.

Happily this state of things will not last long, as in a few years the present transitory condition of the remaining private roads will come to an end; but the fiscal greediness which is one of the ugliest traits of our administrative organs will remain, as it is rooted in the political development of Prussia, and as it directly flows from some of our best institutions. "The fisc" (the state in its quality as owner and claimant of private property and rights) is to all independent people the most hated corporation. As mean, as hungry, as contemptible as the fisc, is a common saying. The judges, with rare exceptions, are happy when they can render judgment against the fisc. It finds its only explanation and excuse in the gradual development of Prussia out of small and scanty beginnings, and will finally be swept away by the growing wealth and independence of the people.

"Putting on Style."

Evidently they are beginning to assume airs in the remote parts of Russia even, as shown by the following from the *Pall Mall Gazette*:

"After much discussion, the committee of a certain club in a remote Russian town has drawn up the following set of rules for the guidance of its members. The code seems to be as Draconian as its original:

"(1) No one shall enter the club with dirty boots. (2) No one shall wear his workaday clothes if they are impregnated with unpleasant smells, such as a scent of fish, leather, pitch, etc. (3) At the club dances black cloth is laid down as the correct dress. (4) In bad weather, when the streets are muddy, all members of the club must wear slippers, so as not to dirty the floor. (5) Whoever shall dare to put in an appearance at a club ball in a velvet waistcoat or a green cravat renders himself liable to a fine of 1 ruble and a half, to be put aside for the benefit of the musicians. (6) (a very stringent rule this) It is expressly forbidden that any member, in the course of a *sorée dansante*, shall use the ball-room curtains for a pocket-handkerchief. If he does he will be ignominiously kicked out. (7) The man who smokes (also at a *sorée dansante*) in the portion of the club set aside for ladies shall be instantly fined 25 kopecks, to go toward the purchase of powder or eau de cologne for the ladies. (8) No member who may happen to be exhilarated, no matter how late in the evening, shall be allowed to introduce the can-can in a set of quadrilles.

The other rules prescribe that no one who is tipsy "beyond the bounds of decency" shall remain in the ball-room. The *buffetier* shall be responsible for such persons—which seems rather hard on the *buffetier*. Every drunken man shall be fined three rubles—the product to go to the formation of a library; and in case of a dispute at billiards the disputants are warned against using the cues to back their opinions, under a penalty of 40 kopecks per blow."

Fastidious people who travel much in this country often have occasion to wish that there was some code of rules to govern the conduct of a certain class of passengers, and to which they could be compelled to conform. The rules of the Russian club, slightly modified to suit the circumstances of railroad travel, might answer as a guide for tentative legislation of this kind.

THE CENSUS OF THE RAILROADS.

Statistics of the Traffic and Fiscal Operations of the Railroads in the United States for Fiscal Year Ending in 1880.

Composition of the Geographical Groups.

Group I.—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut.

Group II.—New York, Pennsylvania, Ohio, Michigan, Indiana, Maryland, Delaware, New Jersey and District of Columbia.

Group III.—Virginia, West Virginia, Kentucky, Tennessee, Mississippi, Alabama, Georgia, Florida, North Carolina and South Carolina.

Group IV.—Illinois, Iowa, Wisconsin, Missouri and Minnesota.

Group V.—Louisiana, Arkansas and Indian Territory.

Group VI.—Dakota, Nebraska, Kansas, Texas, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Arizona, California, Nevada, Oregon and Washington Territory.

Number of Miles of Finished Road Which Lie in the Respective Groups of States (up to June 30, 1880.)

| | |
|----------|-----------|
| Group 1. | 5,948.30 |
| " 2. | 28,401.12 |
| " 3. | 14,591.83 |
| " 4. | 23,134.45 |
| " 5. | 920.91 |
| " 6. | 14,804.74 |

Aggregate in the United States.

Total number of miles reported operated.

5,948.30

The miles of road shown as operated on railroad statistic tables are the total number upon which the earnings were made by the respective companies, whether they lie in the group to which such companies are accredited or whether some extend into other groups.

The difference between the aggregate finished and aggregate operated (1,109 miles), is caused by the date of the reports of finished roads being later than the financial report of companies giving miles operated, that is, 1,109 miles had been completed in the United States up to June 20, 1880, more than the miles reported operated previous to such date.

Average (cost, value and amounts) per mile of road completed and operated, of assets and liabilities, earnings, income, expenses, profit, dividends and balance retained.

| COST AND CAPITAL : | Amount. | Average per mile of road completed and operated. | |
|--|------------------|--|---------------|
| | | Investment. | Cash. |
| Cost of construction of roads. | \$4,112,367,276a | \$47,387 | \$14,363,038 |
| " equipment. | 418,045,458 | 4,818 | 2,556,428,640 |
| Value of lands owned (including buildings). | 103,319,845 | 1,190 | 55,867,049 |
| Value of telegraph lines and miscellaneous. | 204,913,100 | 2,302 | 10,946,971 |
| Stock and bonds owned (issued by other companies). | 343,800,131 | 3,962 | 142,042,607 |
| Total permanent investments. | 5,182,445,806 | 59,719 | \$34,975,709 |
| Cash assets. | 353,973,981 | 4,078 | 171,928,177 |
| Profit and loss to credit. | 110,697,238 | 1,275 | 2,314,595 |
| Total permanent and cash assets. | 5,536,419,757 | 63,797 | 2,556,428,640 |
| Funded debt. | 2,613,606,284 | 30,117 | 1,151,551,821 |
| Total stock and funded debt. | 5,004,521,680 | 57,068 | 57,529,911 |
| Unfunded debt. | 421,200,804 | 4,854 | 2,334,521 |
| Total capital paid in and borrowed. | 5,425,722,580 | 62,522 | \$61,054,527 |

| EARNINGS, EXPENSES, PROFITS, ETC.: | Amount. | Ave. per mile. |
|------------------------------------|-------------|----------------|
| Gross transportation earnings. | 550,450,594 | 6,038 |
| Total income (all sources). | 661,295,392 | 7,262 |
| Transportation expenses. | 352,800,121 | 4,063 |
| Total expenditures (all classes). | 541,950,795 | 6,245 |
| Net transportation earnings. | 227,650,473 | 2,623 |
| Net income or profit. | 119,344,597 | 1,375 |
| Dividends declared. | 70,550,342 | 813 |
| Amount retained. | 48,794,255 | 562 |

a This amount includes funds expended upon partly completed miles of road under construction. It was impossible to obtain from railroad companies the respective amounts paid out for an exact number of miles entirely completed.

INCOME.

Amount. Total. Aggregate.

Gross transportation earnings. \$350,450,594

Incomes from all other sources:

Rents. \$53,543,710

Interest and dividends from assets. 27,301,087

80,844,797

\$601,995,991

Less—

Transportation expenses. \$352,800,120

General expenses of lessor companies. 1,570,848

Interest on funded debt. 126,442,310

Interest on unfunded debt. 9,157,98

Rentals. 51,790,719

541,950,795

Deduct—

Expenses over earnings. \$1,437,591

Expenses over other income. 13,286,921

14,714,502

527,286,208

Net income or profit reported by companies having no deficits. \$134,059,098

Preferred dividends on—

Common stock. \$6,893,263

81,670,919

870,550,342

Deduct—

Dividends declared by some companies having no net income. 520,974

70,020,868

Balance retained. \$61,038,730

Note.—Against this balance stand the deficits of other companies, viz., \$15,244,470.

INCOME.

Group. Income. Expenditures. Net income applicable to dividends.

I. \$51,545,127 \$41,828,920 \$10,631,175

II. 333,726,090 276,324,211 56,169,787

III. 53,211,561 46,774,219 8,526,416

IV. 137,081,135 169,117,207 30,036,912

V. 4,529,806 3,838,783 762,706

VI. 81,201,582 63,967,455 18,932,032

Total. \$601,295,391 \$541,950,795 \$134,059,098

Dividends declared. Surplus. Deficit.

I. \$7,946,197 \$2,689,571 \$6,257,620

II. 37,070,429 28,316,187 7,784,738

III. 3,510,426 5,241,511 2,314,595

IV. 15,105,365 14,978,371 2,216,808

V. 6,917,925 12,050,384 71,592

VI. 6,917,925 12,050,384 1,734,183

Total. \$70,550,342 \$61,038,730 \$15,244,470

* This amount is reported by companies having earned a profit, the difference of \$14,714,502 between such profit and the amount obtained by deducting expenditures from income is created by the deficits made by companies whose expenses were more than their earnings.

† This amount includes \$529,974 of dividends declared by companies having no net income whatever.

BALANCE SHEET UNITED STATES RAILROADS.

ASSETS.

Amount.

Construction of roads. \$4,112,367,176

Equipment. 418,045,458

Lands. 102,319,445

Stocks (of other companies). 184,866,5

TABLE A.

Exhibiting the per cent. of profit upon capital stock (paid in) of companies which report net income available to the payment of dividends.

| PER CENT. OF PROFIT. | GROUP I. | | GROUP II. | | GROUP III. | | GROUP IV. | | GROUP V. | | GROUP VI. | | AGGREGATE FOR THE UNITED STATES. | | | PER CENT. OF PROFIT. |
|---|----------|------------------|-----------|------------------|------------|------------------|-----------|------------------|----------|------------------|-----------|------------------|----------------------------------|------------------|---------------|----------------------|
| | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Amount of stock. | No. cos. | Per cent. |
| Up to 1 | 7 | \$6,561,49 | 25 | \$12,331,426 | 19 | \$29,767,119 | 14 | \$69,400,086 | 4 | \$4,391,487 | 18 | \$104,74,974 | 93 | \$94,782,694 | 18.77 | Up to 1 |
| 1 to 2 | 7 | 22,7 9,476 | 19 | 7,57,771 | 11 | 19,107,915 | 21 | 78,1,618 | 1 | 300,000 | 7 | 6,247,473 | 64 | 215,01,962 | 10.23 | 1 to 2 |
| 2 to 3 | 13 | 15,657,782 | 18 | 9,667,049 | 7 | 8,231,907 | 7 | 16,9,543 | 2 | 8,234,00 | 52 | 19,361,44 | 9 | 19,361,44 | 2 to 3 | |
| 3 to 4 | 11 | 13,208,95 | 21 | 19,2,9,50 | 3 | 7,6,800 | 8 | 15,9,484 | 1 | 1,000,000 | 3 | 6,89,05 | 47 | 64,37,36 | 3.05 | 3 to 4 |
| 4 to 5 | 11 | 16,086,5 | 4 | 7,6,800 | 4 | 9,68,000 | 4 | 3,24,300 | 10 | 20,5,20 | 34 | 52,92,063 | 2.52 | 4 to 5 | | |
| 5 to 6 | 9 | 5,68,000 | 18 | 23,0,65 | 9 | 1,000,000 | 9 | 8,20,00 | 2 | 6,24,500 | 10 | 19,361,27 | 19.36 | 19,361,27 | | |
| 6 to 7 | 14 | 15,8,53,6 | 37 | 91,74,32 | 2 | 16,4,1,87 | 9 | 13,37,000 | 1 | 13,37,000 | 1 | 13,37,000 | 6.14 | 6.14 | 6 to 7 | |
| 7 to 8 | 9 | 17,7,3,988 | 26 | 74,2,6,017 | 9 | 16,1,707 | 9 | 24,88,4,4 | 3 | 12,95,000 | 6 | 137,61,080 | 6.52 | 2 to 8 | | |
| 8 to 9 | 5 | 7,3,0,0,0 | 21 | 70,373,344 | 3 | 3,95,1,103 | 5 | 58,374,730 | 1 | 749,000 | 4 | 6,5,5,700 | 38 | 156,457,567 | 7.44 | 8 to 9 |
| 9 to 10 | 6 | 8,28,775 | 6 | 8,757,6 | 6 | 8,0,818 | 6 | 1,459,000 | 20 | 70,41,556 | 33 | 9,1,91 | 10 | 10,1,91 | 9 to 10 | |
| 10 to 15 | 9 | 28,018,930 | 38 | 273,4,9,92 | 7 | 15,19,911 | 11 | 112,551,636 | 2 | 211,000 | 4 | 46,5,1,90 | 71 | 479,357,019 | 22.79 | 10 to 15 |
| 15 to 20 | 6 | 2,1,6,48 | 3 | 3,012,73 | 3 | 22,9,8,00 | 3 | 5,000,000 | 3 | 11,91,254 | 17 | 67,3,7,87 | 8 | 29,15 to 20 | 15 to 20 | |
| 20 and upward | 13 | 4,3,6,11 | 6 | 3,3,1,03 | 4 | 24,0,000 | 8 | 0,33,000 | 31 | 14,10,3,12 | 1 | upward | 6.83 | 6.83 | 20 and upward | |
| Aggregate | 101 | \$169,687,791 | 262 | \$93,144,147 | 92 | \$172,6,5,53 | 92 | \$422,322,116 | 10 | \$12,752,477 | 66 | \$38,1,35,663 | 623 | \$2,103,068,246 | 100.00 | Aggregate |
| Total net income available to dividends upon stock of companies herein included | | \$10,410,097 | | \$84,966,211 | | \$8,356,415 | | \$29,645,636 | | \$754,000 | | \$18,856,905 | | \$132,989,336 | | |
| Average per cent. profit | | 6.16 | | 6.93 | | 4.81 | | 7.02 | | 95.91 | | 4.86 | | 6.92 | | |
| Net income of companies having no stock | | \$221,078 | | \$293,776 | | \$169,908 | | \$891,346 | | \$8,640 | | \$75,124 | | \$1,060,782 | | |

RESULTS OF TRAFFIC OPERATIONS.

| GROUP. | Miles of road open | EARNINGS | | | | | EXPENSES | | | | | Net earnings... over | Expenses... over |
|--------|--------------------|---------------|-------------|-----------|------------|-------------|----------------------------|------------------|--------------------------|-------------|-----------------|----------------------|------------------|
| | | Passengers... | Express... | Mails... | Freight... | Total... | Maintaining road estate... | Renting stock... | Operating and general... | Total... | Net earnings... | | |
| I. | 5,887,30 | 70 | 19,497,908 | 1,11,381 | 7,5,217 | 25,548,331 | 46,042,470 | 944,693 | 4,849,543 | 17,88,89 | 32,11,231 | 14,780,276 | 2,777 |
| II. | 7,69,782 | 9 | 6,31,522,3 | 9,0,61 | 4,30,613 | 21,7,9,3,25 | 51,17,921 | 43,32,311 | 36,2,8,714 | 10,10,646 | 17,5,4,672 | 1,84,2,030 | 821,681 |
| III. | 14,412,11 | 12 | 11,577,64 | 768,370 | 1,3,71,41 | 35,499,536 | 49,17,25 | 1,83,1,8 | 5,0,3,07 | 16,42,951 | 32,26,34 | 16,973,340 | 66,944 |
| IV. | 25,371,01 | 101 | 27,383,121 | 1,8,192 | 2,479,4 | 91,72,5,580 | 12,6,421 | 23,892,788 | 10,1,3,07 | 18,63,97 | 22,592,92 | 54,1,962 | 3,8,28 |
| V. | 8,677,71 | 12 | 8,1,394 | 19,0,10 | 1,2,161 | 3,0,1,043 | 4,185,578 | 912,2,8 | 1,6,0,27 | 2,0,2,59 | 3,1,9,885 | 1,0,9,23 | 5,5,87 |
| VI. | 13,044,84 | 71 | 17,679,7 | 1,151,24 | 1,733,6,24 | 46,81,193 | 22,3,9,840 | 4,389,8,7 | 19,5,6,823 | 36,6,2,61 | 33,345,538 | 100,44 | |
| Total | 66,781,47 | 63 | 144,101,7,9 | 8,838,250 | 10,472,513 | 4,0,145,738 | 58,450,564 | 102,683,043 | 64,9,45,840 | 194,010,660 | 352,800,120 | 220,078,054 | 1,427,580 |

a. This amount includes 902,055 of earnings which were not specified by the companies reporting same.

b. This amount includes 91,1,77 of expenses which were not specified by the companies reporting same.

c. This amount includes 281,0,00 of net earnings which were reported by companies not specifying earnings or expenses.

| RAILROAD SYSTEM OF THE UNITED STATES. | | | | | Disposition of Net Earnings. | | | | |
|---|---------------|----------|---------------|-----------|--|--|-------------|------------------|---|
| Aggregate Transportation Earnings. | | | | | Net earnings... over | | | | |
| Item. | Amount. | Percent. | Total. | Per cent. | Net earnings... | Less expenses over earnings by some Cos... | Paid... | Fixed charges... | Less income from other sources than earnings... |
| Total passengers | \$98,321,310 | 65.23 | | | \$229,785,054 | | \$1,427,581 | \$187,270,826 | |
| Through | 44,514,393 | 30.80 | | | | | | | \$80,844,797 |
| All other | 1,265,976 | .88 | | | | | | | |
| Total | 100.00 | | \$144,101,709 | 24.83 | | | | | |
| Express | | | 8,878,759 | 1.52 | | | | | |
| Mails | | | 10,472,813 | 1.80 | | | | | |
| Local freight | 233,688,202 | 56.16 | | | | | | | |
| Through | 1,6,009,191 | 42.51 | | | | | | | |
| All other | 5,548,425 | 1.33 | | | | | | | |
| Total | 100.00 | | 416,145,758 | 71.69 | | | | | |
| Earn. not analyzed | | | 92,0,055 | 0.16 | | | | | |
| Aggregate | | | \$580,450,594 | 100.00 | | | | | |
| Transportation Expenses. | | | | | Per cent. | | | | |
| Items. | Amount. | Total. | Per cent. | earninga. | Description. | companies. | Amount. | Total. | Per cent. |
| Repairs of road-bed and track | \$39,603,076 | | 11.23 | 6.85 | Stock of companies which report net income available to dividends (preferred and common combined) paid in of those companies which have reported a net income available for dividends after having paid the interest upon their funded and other debts, also the per cent. of such net income or profit upon the respective amount of stock. | | | | |
| Renewal of rails | 17,243,950 | | 4,89 | 2.92 | | | | | |
| " ties | 10,741,577 | | 3.04 | 1.85 | | | | | |
| Repairs of bridges | 9,000,097 | | 2.55 | 1.56 | | | | | |
| " buildings | 7,644,121 | | 2.17 | 1.32 | | | | | |
| Repairs of fences, cross-ings, etc. | 1,480,926 | | .42 | .26 | | | | | |
| Tel-graph expenses | 3,576 477 | | 1.01 | .62 | | | | | |
| Taxes | 13,283,819 | | 3.77 | 2.20 | | | | | |
| Total maintaining road and real estate | \$102,583,043 | | 29.08 | 17.67 | | | | | |
| Repairs of locomotives | 21,830,963 | | 6.19 | 3.76 | | | | | |
| Repairs of passenger, baggage and rail-cars | 10,558,824 | | 2.99 | 1.82 | | | | | |
| Repairs of freight cars | 22,395,533 | | 6.40 | 3.89 | | | | | |
| Total repairs rolling stock | 54,985,340 | | 15.58 | 9.47 | | | | | |
| Passenger train service | 10,046,080 | | 2.85 | 1.73 | | | | | |
| " supplies | 1,148,810 | | .33 | .20 | | | | | |
| " car mileage | 8,075,252 | | .23 | .14 | | | | | |
| Freight train service | 10,892,343 | | 5.64 | 3.43 | | | | | |
| " supplies | 1,230,905 | | .36 | .22 | | | | | |
| " car mileage | 7,781,828 | | 2.21 | 1.34 | | | | | |
| Fuel for locomotives | 32,836,470 | | 9.31 | 5.66 | | | | | |
| Water supply | 2,338,467 | | .68 | .41 | | | | | |
| Oil and water | 3,754,670 | | 1.06 | .65 | | | | | |
| Locomotive service | 27,239,568 | | 7.72 | 4.69 | | | | | |
| Agents and station service | 36,767,299 | | 10.42 | 6.33 | | | | | |
| Station supplies | | | | | | | | | |



PUBLISHED EVERY FRIDAY.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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THE CENSUS OF THE RAILROADS.

We publish to-day the first complete statistics of the railroads of the United States that have ever been collected, being an abstract of the statistics collected and compiled for the United States census of 1880, and contained in the Census Compendium published this week—the abstract in the Compendium and here reproduced being a condensation of what will make a volume of 750 pages of United States railroad statistics, giving the date for each corporation separately, which volume will not be published for several months.

Heretofore we have had no complete statistics for the whole country. No one has had authority to call upon all the railroad companies to give definite information as to mileage even, not to say cost, capital, details of earnings and expenses, profits, etc. What statistics we have had have been the result of individual enterprise, which had to accept such information as the several companies chose to give, and in the shape they preferred, which was usually what was easiest to give. Poor's Manual, beginning with very imperfect data, has of late been able to secure returns of some kind from nearly all the companies. For mileage, stock, bonds, the principal sources and the total working expenses, these reports are generally satisfactory and uniform. For traffic, they are much less complete—so much so that it has never been possible to compile any statement of the total traffic—train miles, passenger miles, ton miles; and consequently we could not know the average rates received and the average cost per unit of traffic. And when it came to details of expenses, there was utter confusion. Expenses are reported uniformly in some states; but taking the country together, what with the differences in reporting details and the companies which reported no details of expenses, it has been impossible to find the average or aggregate cost say of rail or tie renewals, of maintaining locomotives or cars or road, of train or station service, etc.

The Census Bureau, having authority, drawing up uniform schedules for reporting, issuing them early, but more than all by exercising intelligence in receiving, criticising and using the reports—requiring explanations and corrections where anything seemed obscure or imperfect or incorrect—has been able to compile a reasonably complete and accurate report of all these data for the whole railroad system of the United States.

The compilation of these statistics, which is a work

requiring great intelligence and special knowledge of the subject—a bare footing of the data, without sifting and checking them giving results which are almost worthless—is the work of Mr. A. E. Shuman. In the tables of the compendium, which we publish to-day, he has given special attention to an examination of the average rate of profit of the railroad system, which, as an examination of the tables will show, is a somewhat complex matter. This, perhaps, has more general public interest than the other facts reported; but to us and to the railroad companies the most important features are the complete statements of traffic, which for the first time enables us to know the average receipt, expense and profit per train mile, per ton mile and per passenger mile in the United States, and compare them with the receipt and cost in other countries and on individual roads, and the information as to the different items of expense, hitherto entirely inaccessible, and valuable for many other purposes than comparisons.

The census required an exact statement of the miles of railroad completed at the end of June, 1880, which were found to be 87,891.35. Poor's Manual reported 86,497 miles completed at the beginning of that year, and 93,671 at the end of it. Our own records indicate that about 2,400 miles were completed in the first half of 1880 and 4,800 in the second half. It appears then that the Manual reported just about 1,000 miles too much—an error of only $1\frac{1}{8}$ per cent., however. But the Manual last year had reports of about 1,800 miles which it had not previously reported, and which were not constructed in 1881, and made the length in the United States at the end of 1881 104,813 miles. But our records show that only 14,300 miles of road were built from June 30, 1880, the date of the census mileage, to the end of 1881, so that the actual mileage at the beginning of 1882 must have been just about 102,200 miles, or 2,600 miles less than the Manual reported. Very great care was taken by the Census Bureau to make these mileage statistics complete and accurate, to include all roads actually completed ready for operation at the date named and to exclude all partly completed and projected lines, which companies sometimes include in their statements of mileage in such a way that they cannot be easily detected and separated. The publication of the volume of railroad statistics, giving the mileage for each road, will make it possible to check the Manual by it, and in this and in almost every other particular will correct errors, some of which have been long perpetuated.

The reports of capital, traffic, earnings, etc., are not for the year ending with June 30, but for that fiscal year of each company which ended in 1880—the Rock Island for the year ending with April, for instance; the Northwestern for the year ending with May; a large group for the year ending with June; a still larger group for the year ending with September, and another large number, including the Pennsylvania and its leased and controlled lines and many of the most important Western roads, for the year ending with December.

It was of course desirable that the reports of all companies should be for the same twelve months; but it was impossible. The records kept by the companies would not enable them to make a report such as the census required for any other than the year covered by their own reports, at least not without enormous labor and expense, not justified by the advantage to be gained. For most purposes the statistics are just as valuable as they are.

The mileage for which operations, etc., are reported is slightly less than the total completed June 30, amounting to 86,781 miles. Not all of this, of course, had been worked an entire year. The statistics of construction indicate that about 4,500 miles of it had been opened from time to time during the year, and the average mileage worked was probably more nearly 84,000 miles than the 86,781 reported. This makes the census figures for earnings, etc., per mile of road a little too small—probably 3 per cent. too small.

The census found that the companies owning the 86,781 miles of railroad had property costing \$5,536,419,787, which is at the rate of \$63,797 per mile of road, represented by stocks and debt to the amount of \$62,522 per mile. The aggregate of stocks and bonds is not far from that reported in Poor's Manual for 1881, which should have the same reports from most roads, but reported 6,800 more miles of road. The census, however, found \$421,000,000 of unfunded debt; the Manual but \$162,500,000.

Following our usual course with railroad reports, we state below concisely the chief features of this great census report for the whole railroad system of the United States in 1880.

The work done by these 86,791 miles of railroad in-

cluded 251,022,710 freight-train miles and 138,325,621 passenger-train miles—together more than four times the distance from the earth to the sun; and traffic equivalent to one ton of freight carried 32,348,846,698 miles, and one passenger carried 6,189,240,914 miles, with the following results:

| | Per freight-train mile. | Per pass. train mile. | Per ton mile. | Per pass. mile. |
|----------|-------------------------|-----------------------|---------------|-----------------|
| Receipt | \$1.65 | \$1.19 | 1.29 cts. | 2.33 cts. |
| Expenses | 0.98 | 0.76 | 0.78 " | 1.71 " |
| Profit | \$0.67 | \$0.43 | 0.53 ct. | 0.62 ct. |

The report gives the through tonnage mileage as 56 per cent. of the whole, but it is not at all likely that the companies all made the same definition of through freight, concerning which there are different practices, and some would include twice as much as others. The average rate on local freight is given as 1.64 cents per ton per mile; on through, 1.01 cents.

The train movement was equivalent to 2.2 passenger trains and very nearly 4 freight trains each way daily, or one train in each direction every $3\frac{1}{2}$ hours. This should give a realizing sense of the unused capacity of the railroads. Some even single-track roads probably have ten times as great a train movement. One double-track road has had more than sixty times as many trains.

The traffic was equivalent to 96 passengers and 510 tons of freight each way daily over the entire mileage, and the average train load for the whole United States was 44 $\frac{1}{4}$ passengers and 129 tons of freight—equal to a full car of passengers and 11 cars of freight. Meagre as this seems, the average freight-train load is probably larger than in any other country. The largest average on any one road in this country is about twice as great as the average for the whole country.

The census has divided the expenses between passenger and freight traffic, so as to give the cost per passenger-train mile and per passenger mile separately. It is not at all probable that this division is an accurate one, as the accounts of many companies do not show plainly even what was exclusively chargeable to one branch of the traffic, but nevertheless the figures given are probably approximately correct. They make the expense per freight-train mile about 30 per cent. greater than the expense per passenger-train mile; but the earnings of the former are so much greater that its profits are 56 per cent. greater.

The average rate per ton per mile, 1.29 cents, is less than in any other country, which we hardly expected. For the lines between the Mississippi and the Atlantic seaboard north of the Ohio, rates were known to be much lower than any foreign rate; but we have a great many railroads in thinly peopled country on which rates necessarily are high—on some very high. But the proportion of this high-priced traffic is so very small that it has comparatively little effect on the average rate; and the enormous traffic of the trunk lines and their connections, which have an average rate of less than a cent per ton per mile, has a great effect on the average rate of the whole country.

The average passenger rate (2.33 cents per mile) is higher than in the principal countries of Europe, with the possible but not probable exception of England.

Not the least interesting feature of the report is the statement of the number of men employed. This has sometimes been absurdly exaggerated. The census shows that there were 418,957 in 1880, or an average of 4.8 per mile of road. The wages paid to these men amounted to \$195,350,013, or an average of \$466.23 per year.

The gross earnings of the railroads of the United States were \$580,450,594, or \$6,688 per mile of road; the working expenses were 60 $\frac{1}{2}$ per cent. of this amount, or \$4,065 per mile, and the net earnings \$2,623. There was besides an income from other sources than transportation, and the aggregate profit available for interest on the capital invested was \$245,786,907, which was 4.91 per cent. on the whole amount of capital stock and funded debt. The amount available for dividends was \$119,344,597, which is 4.566 per cent. on the total stock outstanding. The dividends actually made, however, were at the average rate of 2.699 per cent., amounting to a little more than \$70,000,000, to \$813 per mile of road, and to 12.2 per cent. of the gross earnings.

Further important facts shown by or deducible from the census tables must be left for the present. They will afford material for frequent use hereafter, probably until we have figures from the next census, unless meanwhile we should have provision for national railroad reports yearly, which, if they could be made to take the place of the numerous and various state reports, would be a great saving of labor to many of the reporting companies, and would have all the value that the best of these have, with another and very great one of their own.

THE USE OF SCRAP IN MAKING CAR WHEELS.

II.

We come now to consider what influences in the pig iron affect the composition and consequently the strength and other properties of the alloy. As to the silicon and manganese, the amount of these substances in pig iron is partly a function of the ores used and partly a function of the temperature of the furnace in which the pig is made. If there is no manganese in the ore, there will of course be none in the pig; but with certain proportions of silica and oxides of manganese in the ores, the amount of silicon and metallic manganese in the pig will be the greater the hotter the furnace, a fact which explains why in general charcoal irons are lower in silicon than those made with anthracite or coke. The amount of combined carbon in pig iron seems to depend on a number of circumstances. These may be stated briefly as follows: The more sulphur and manganese the pig contains, other things being equal, the more combined carbon there will be; on the other hand, other things being equal, the more silicon and phosphorus there is in the pig the less combined carbon there will be. Of these substances having influence on the combined carbon, perhaps the silicon is the most important, since in by far the larger part of irons used for car wheels the sulphur is quite small, and the manganese and phosphorus are, so far as our knowledge goes, never large in amount. It follows, therefore, that the strength of the alloy we have been considering, in so far as this strength is dependent upon the amount of combined carbon in it, is largely a question of the amount of silicon it contains. And since, again, as every one conversant with the subject will confess, the strength of pig iron is very generally affected by its content of combined carbon, it seems clear that the fitness of a pig iron for making car wheels, so far as the fitness is a question of strength, is narrowed down to two elements, provided the iron does not contain a large amount of manganese. These two elements are, the amount of the foreign substances in the metal, as previously described, and the proper proportion of silicon. If the amount of foreign substances in the wheel is too great, it is too weak, by reason of want of continuity in the metal. And if the silicon is too low, the amount of combined carbon becomes too great, and in consequence the wheel is too brittle for safety. We shall see as we proceed that the influence of silicon on strength is not the only important part it plays in the manufacture of car wheels.

Turning now to another phase of the question for a few moments, we inquire how wheel irons differ from ordinary pig irons. The answer is, principally in the amount of silicon they contain. As has been stated above, the presence of silicon influences the amount of combined carbon in the iron. And, as is well known, the characteristic of wheel irons is that they will chill, that is, when poured against cold iron all or nearly all of the carbon in the metal next to the chill is by the sudden cooling retained in the combined form. If now the amount of silicon in the metal is too great, the iron will not chill, since, as has just been stated, the silicon prevents the carbon from assuming the combined form. And this is the principal difference between car-wheel irons and those not adapted to this purpose—namely, car-wheel irons contain from $\frac{1}{2}$ to $1\frac{1}{4}$ per cent. of silicon, while non-chilling irons usually contain from 2 to 3 per cent. of silicon. This influence of silicon on the combined carbon renders it an exceedingly important element in car-wheel manufacture. Not only the strength of the wheel but also its depth of chill is very largely dependent on the proper amount of silicon in the metal from which the wheel is made. Indeed, we cannot but think that where irons are used in which the other substances are within moderate limits, the success or failure of the wheels made depends more on securing the proper amount of silicon in the metal than on any other single item. As has already been said, if the silicon is too high, the metal will not chill; if it is too low, the wheel becomes worthless on account of its brittleness.

Thus far the subject under discussion has been that substance which is supposed to be principally used in making car wheels—namely, pig iron. But the substance our correspondent complains about is scrap, and we therefore inquire what scrap is, and why its use is considered objectionable. As to the first of these inquiries, all metal which has been at least once through the cupola may, so far as our discussion is concerned, be regarded as scrap. Old wheels are scrap, and so also are the sprues and the wheels lost in manufacture or condemned on inspection at the foundries before they are put in service. At some foundries this latter is quite an important source of scrap metal. As to the second query above, why the use is

objectionable, it must be considered by those who object to its use that the new metal used in making car wheels is in some way injured thereby, either by its passage through the cupola or after the wheel is made; else why is not scrap as good as new metal? But, of course, no one will claim that the composition of the metal changes after the wheel has been put in service. And again, the changes of structure due to vibration, etc., if such changes occur during service, must, of course, be obliterated by the remelting of the metal when it is used over again as scrap, so that whatever objection there is to the use of scrap must arise from some change which is believed to take place in the metal on its passage through the cupola. We are quite ready to acknowledge that the cupola changes pig iron. We do not believe it possible to remelt the same iron several times or even once without changing its chemical composition and, consequently, its strength and other physical properties. And while it is not certain that all the changes produced in pig-metal by the cupola are understood, we are inclined to think the principal ones are a diminution in the amount of silicon and an increase in the amount of the foreign substances, notably the slag and oxides. Now from what has already been said, the influence of these two changes will be readily understood. The diminution of the silicon increases the amount of combined carbon, and consequently, up to a certain point, if the iron had considerable silicon to start with, increases the strength of the metal. At the same time the increase in the amount of foreign substances, such as slag and oxides, continually weakens the metal by interfering with its continuity. The phenomena resulting from successive remeltings of the same iron can be almost entirely explained in this way. Starting with an iron pretty high in silicon, and consequently low combined carbon and not much strength, the first remelting diminishes the silicon, increasing thereby the combined carbon, and consequently the strength, the increase of foreign substances, slag and oxides not being sufficient to counterbalance the increase in strength due to increase in combined carbon. Each successive remelting does the same thing, until finally the amount of silicon has become so small and of the foreign substances so large that the metal has reached its maximum of strength, and each subsequent remelting diminishes this valuable property. It is possible that the amount of slag and oxides may reach a maximum before the maximum of strength is obtained, since, if at each melting the metal is allowed to stand quiet in the molten condition for a period of time before casting, a portion at least of these foreign substances rises to the top and is removed. In this case, the ultimate diminution in strength arises from the diminution of the silicon, as has already been explained. In the case of car wheels, the number of remeltings that the metal can endure without too great injury is undoubtedly small—perhaps none at all. The amount of silicon in car wheels is not large to start with, for if it was the chill could not be obtained. And it is entirely possible that the first remelting of old or scrap car wheels would so much diminish the silicon and increase the foreign substances, slag and oxides, that a wheel cast from this metal alone would be entirely unsafe. But we do not think it follows from this that no scrap should be used in the manufacture of car wheels, nor that if new irons alone are used the wheels made from them will be always as strong as they should be. If new irons containing too little silicon, such as the high numbers of charcoal irons, are used, even though they do not contain any slag and oxides, the wheels made from them will be dangerously brittle. And this is what was meant when it was said at the outset that it was possible to make wheels from new irons alone that would be as unsafe as wheels made from however large a proportion of scrap.

If this conception of the matter is correct, the scrap metal differs from new metal of certain grades only in containing perhaps a little more of the foreign substances, such as slag and oxides. But every wheel, whether made of new iron or not, contains more or less of these foreign substances, and the only question is, therefore, whether the use of a moderate amount of scrap will bring the amount of the foreign substances up to an unsafe limit. We are free to confess that we do not think so, and we know of a foundry where large amounts of scrap have been used for years which can show a record as to broken wheels which it would be hard to surpass with the use of new iron alone.

The correct method of making chilled iron car wheels then, so far as their manufacture depends on the metal in them, would seem to be to learn by analysis of a sufficient number of car wheels which

have given remarkable service what are the best proportions of the various substances occurring in the metal. Then by proper mixture endeavor to get these proportions. And we are unable to see why in obtaining these proportions a moderate amount of scrap should not be used.

The knowledge now at command indicates that wheels of about the following composition will be satisfactory as to chill, and if the metal is properly manipulated and treated during and subsequent to manufacture, will, with the usage of railroads in the United States, almost never fail by breaking:

| | Per cent. |
|----------------------------|--------------|
| Total carbon..... | 3.25 to 3.75 |
| Silicon | 0.75 to 0.85 |
| Manganese, not above | 0.50 |
| Phosphorus | 0.45 |
| Sulphur | 0.10 |
| Slag and oxides | 0.50 |

In obtaining the above composition there is no danger in using 30 to 40 per cent. of old or scrap wheels.

The Political Economy of Railroads.*

II.

RAILROAD COMPETITION.

Free competition is the first condition of private economy. Some have tried to find this competition in railroad management, and have advocated in consequence the principle of *laissez faire*. Their narrow conception of the sphere and province of government is so dear to them that they will not cease to cling to it, so long as a single thread remains for them to hold to.

The extreme view of this school is that which is unable to find any difference whatever between a railroad and any private business undertaking, like keeping a shop, for example. Few advocates of this extreme position are still to be found in Europe. A German writer in 1877, however, attempted to defend it. He maintains that the capital invested in any undertaking "competes with itself on account of the necessity of offering its services in the market, just the same whether the capital is in one hand or in different hands." It is difficult to tell what he means, but it seems to be simply this: A large amount of capital is fixed in every railroad, which must be used to pay. Now railroads are bound to put their prices so low that they can perform a paying number of services for the public, i. e., railroads can charge not "what they will," but only "what they can get." It is not shown, however, that the action of this "law of prices" is far-reaching enough to render state control unnecessary. Nor is any guarantee given that under the same circumstances the same prices will be demanded from all, nor that in other respects the interests of all will be equally well cared for. No provision is made by this theory for cases in which the general welfare demands lower rates than the most profitable ones. Besides, as already explained, railroads are frequently public necessities when there is no prospect of their paying as a private business undertaking.

A modification of the view just described is that called "competition for the field." Competition is a sufficient regulator, say the advocates of this theory, but it does not need to be simply "a battle in the field;" it can also appear as "battle for the field." It is held that in this way it is possible to combine the advantages of private activity, monopoly and competition. Different competitors strive for a concession to build a given railroad, and government grants it to him who offers the most favorable conditions. There are, however, only certain cases where several competitors would seek a concession, as where one makes a more favorable offer than another on account of having calculated better; or, secondly, where the one making the lower offer is in error as regards circumstances affecting the cost of building and working the railroad. In these two cases no real competition takes place. This happens where one is satisfied with smaller profits than others. Competition will take place, then, only when a profit is to be made equal to at least the ordinary rate of interest. For all lines where this is not the case, and also for those where there are no real competitors seeking for a concession, this theory does not hold. Without the co-operation of the state—and this theory presupposes free competition as the only agent—only the most profitable lines would be built; others would be built and worked only by reason of an economic and lamentable error. Besides this, the number of competitors is so small that they are apt to come to an understanding among themselves. Then, the one remaining competitor can charge the expense of inducing his rivals to abstain from competition to the cost of building the road. When in 1845, for example, the concession for a railroad from Paris to Lyons was to be granted in this way, the different competitors combined together, so that no competition whatever took place. The theory is an English one and has found only few adherents.

It has been attempted by others to show that railroads were subjected to the same laws as ordinary kinds of business on account of the competition between different railroads at railroad centres. (Die Verkehrsrtheilung in den Knotenpunkten.) This is, however, only a quasi-competition. This theory of railroad competition has been for a long time the prevailing one and has found many adherents. If a certain extent of country is provided with two railroads the traffic will be attracted in each case by that railroad which is able to care for it in the best manner, both as regards price and quality. The entire carrying business of the district will be divided between the two roads according

* Die Verkehrsmittel in Volks- und Staatswirtschaft, von Dr. Emil Sax. 2 Bände. Wien, 1878-79.—(The Means of Communication Considered from a Political-Economic Standpoint, by Dr. Emil Sax. 2 vols. Vienna, 1878-79.)

to their economic qualifications and the topical limits of their superiority. In a great city, the traffic would be divided more or less according to the situation of the stations. If both lines were in an equally favorable position for doing the business of a city or any given extent of territory, it would naturally be divided evenly between them. The conditions under which the most favorably situated line can perform a given service become the most favorable under which any line will do it. The apparent competition which leads to a division of traffic is only the impelling, reducing prices to that point which will bring the largest amount of business to the railroads. When railroad managers go farther, it is a mistake on their part. This division of traffic has been looked upon as competition, and it has been hoped, in consequence, that the solution of the railroad problem would be found by increasing railroad centres until all places were provided with two competing lines.

This theory abounds in errors. The economic effect of a division of traffic is to a certain extent the same as that of competition, but only to a certain extent. Where competition rules, the number of those who satisfy any class of wants is larger and liable to be increased at any moment by a new competition offering still more favorable terms to the public. In the case of a division of traffic between two railroads, on the other hand, each railroad has a monopoly of that share of the business which falls to it. It lies so clearly in the economic nature of the case that the only thing for railroads to do in railroad centres is to divide the traffic so as to do it with the least expense and pool the earnings, that the only wonder is that they hesitated about it so long.

Something like a genuine competition sometimes takes place for the business between different centres, but this is only temporary and to test the economic strength of the different roads. Again, at present all places are not provided with two or more railroads, so this theory would only hold for an ideal future.

The advocates of this theory, too, presuppose that competition at all times and places is a blessing. If with unprejudiced minds they examined the concrete case, they would speedily discover that the evil which railroad competition brings with it so far outweighs the good as to give the decision against such competition, were it everywhere possible. The evils of competition are as follows: more capital is employed for doing the traffic than is necessary; the cost to the railroads of the services they perform is increased in consequence; the price of goods is higher than it would otherwise be, inasmuch as transportation is one element in production; finally, those consumers who do not have the benefits of such competition as exists in such high degree as others, are placed at a disadvantage in the struggle for existence.

It is true that these evils manifest themselves in other forms of production and in commerce, but in less degree and overbalanced by the good competition brought with it. The capital employed in an unprofitable commercial undertaking can to a great extent be withdrawn and employed elsewhere. If a factory does not pay, the buildings and machinery can be employed otherwise. Capital employed in an unprofitable railroad is almost entirely lost, and is so considerable as to affect the interests of an entire people. The capital might have been otherwise employed, particularly in building necessary railroads. Railroads are also held back from reducing rates in numerous cases, as the benefits would accrue to them only after the lapse of several years, and in the meantime a rival road may arise.

LESSONS TAUGHT BY RAILROAD HISTORY.

England.—A main feature of English railroad legislation is the entanglement in the errors of the theory of free competition and *laissez faire*, with a gradual and too late recognition of the mistakes made and insufficient endeavors to correct them. In the first great epoch of railroad speculation, in the thirties, parliament granted concessions for a considerable number of lines with insufficient governmental regulation. The testimony of railroad directors before the Railway Committee of 1844 disclosed clearly the evils resulting from competition, viz.: The building of superfluous lines, the loss of capital, a necessary rise in rates, in many cases improper speculation. Notwithstanding this investigation, the competition theory maintained its ascendancy in Parliament, and numerous concessions were granted to railroads between the chief cities, while places off from the direct lines between these places were neglected. The permanent results of this policy have been an enormous waste of capital, that is, partly a premature expenditure, partly a total loss. In 1846, of the £115,000,000 invested in railroad shares in England, only £43,000,000 paid dividends of 5 per cent and over; in 1876, the railroad shares (not preferred) amounted to £263,000,000, of which 35½ millions yielded no return, 12.9 millions between nothing and 1 per cent, 4½ millions between 1 and 2 per cent, 10 millions between 2 and 3 per cent, 26½ millions between 3 and 4 per cent. A further result is a poorly arranged railroad system for England, so poorly located that a writer in the *Quarterly Review* (October, 1872), said, if 500 flies had been dipped in ink and allowed to crawl over the map of England, they would have drawn a plan for a more rational railroad system than the present. Porter, in his "Progress of the Nation" (Sc. III., c. V.), mentions particularly this consequence of England's *laissez faire* policy.

A further effect of this policy was unjust discrimination against certain parts of the country. When rates were low between prominent railroad centres, they were placed as high as possible elsewhere. This competition between railroad centres has, however, nearly ceased in England, on account of amalgamations, fusions and voluntary agreement on the part of the companies. In 1858 a conference of representatives of English railroads was held in London and agreed that when two places were connected by two or more

railroads, the rates should be the same on all. When the managers are not able to agree upon them, they are established by arbitration. Rates are necessarily much higher on account of a superfluity of roads; they are far higher than on the Continent, though this is due in part to other causes. Railroad companies are not to be blamed for their agreement to cease competing with each other, as it is the only sensible thing for them to do. Parliament was to blame for being misled by a false theory of competition. The advantages of unity in railroad management, that is, increased perfection of service and saving of expense, have led to a further coalition of English railroads.

The progress of the concentration of the British railroads under a few managements may be traced by the following statement of the mileage worked in 1858, 1870 and 1878 by the 13 leading companies, and its percentage of the total railroad mileage in Great Britain:

| | | |
|--------------|------------------------------|--------------------------------------|
| In 1858..... | 5,578 miles | = 64 p. c. of a total of 8,354 miles |
| In 1870..... | 9,806 " = 73 " " " 13,582 " | |
| In 1878..... | 11,604 " = 77 " " " 15,074 " | |

[TO BE CONTINUED.]

December Accidents.

Our record of train accidents in December, given in full upon another page, shows for that month 148 accidents, in which 29 persons were killed and 209 injured. The list includes 64 collisions, in which 26 persons were killed and 75 injured; 77 derailments, with 3 killed and 129 injured, and 7 other accidents, in which 5 persons were injured.

Twenty-eight of the killed and 80 of the injured were railroad employees, while one of the killed and 129 of the injured were passengers or others riding on the trains. Employees constituted 96.6 per cent. of the killed, 38.3 per cent. of the injured and 45.4 per cent. of the whole number of casualties. The proportion of casualties to passengers was increased by a few accidents in which a considerable number of slight injuries to passengers are reported.

In 15 accidents one or more persons were killed; in 45 there was injury to persons, but not death, leaving 88, or 59.5 per cent. of the whole number, in which no serious injury is reported.

As compared with December, 1881, there was an increase of 35 accidents, a decrease of 7 in the number killed and an increase of 113 in the number injured.

These accidents may be classed as to their nature and causes as follows:

| | |
|--------------------------|------|
| COLLISIONS: | |
| Rear collisions..... | 37 |
| Butting collisions..... | 25 |
| Crossing collisions..... | 2 |
| | — 64 |

| | |
|---------------------------------|------|
| DERAILMENTS: | |
| Broken rail..... | 12 |
| Broken switch rod..... | 1 |
| Broke bridge..... | 3 |
| Screwing of rails..... | 10 |
| Broken wheel..... | 4 |
| Broken axle..... | 3 |
| Broken truck..... | 1 |
| Wash-out..... | 1 |
| Land-slide..... | 1 |
| Accidental obstruction..... | 2 |
| Cattle..... | 1 |
| Ice..... | 1 |
| Rail removed for repairs..... | 1 |
| Misplaced switch..... | 13 |
| Purposely misplaced switch..... | 4 |
| Malleable obstruction..... | 1 |
| Unexplained..... | 18 |
| | — 77 |

| | |
|-------------------------------|-------|
| Boiler explosions..... | |
| Broken connecting-rod..... | 1 |
| Broken tire..... | 1 |
| Car burned while running..... | 3 |
| | — 148 |

Six collisions were caused by trains breaking in two; six by misplaced switches; six by mistakes in train orders or neglect to obey them; two by flying switches; two by runaway engines; two by failure to use signals; one each by a wreck upon another track, by blinding snow and by fog.

A general classification of these accidents is as follows:

| | | | | |
|------------------------------|--------------|---------|--------|-----|
| COLLISIONS. | Derailments. | Others. | Total. | |
| Defects of road..... | 26 | 26 | 26 | |
| Defects of equipment..... | 0 | 10 | 4 | 20 |
| Negligence in operating..... | 55 | 14 | 3 | 69 |
| Unforeseen obstructions..... | 3 | 4 | 3 | 10 |
| Maliciously caused..... | 5 | 5 | 5 | 15 |
| Unexplained..... | 18 | .. | .. | 18 |
| | 64 | 77 | 7 | 148 |

Very nearly half the accidents were thus directly due to negligence in management, while probably a number of others could have been prevented by greater care in inspection.

Of the whole number of accidents 72 were in daylight, 74 at night, and in two cases the time is not definitely given or indicated.

A division according to classes of trains and accidents is as follows:

| | | | | |
|-------------------------------|-------------|--------------|--------|--------|
| Accidents: | Collisions. | Derailments. | Other. | Total. |
| To passenger trains..... | 6 | 34 | 4 | 44 |
| To a pass. and a freight..... | 15 | .. | .. | 15 |
| To freight trains..... | 43 | 43 | 3 | 89 |
| | 64 | 77 | 7 | 148 |

| | | | | |
|-----------------|-----|-----|----|-----|
| Casualties: | | | | |
| Killed by..... | 26 | 3 | 20 | |
| Injured by..... | 75 | 129 | 5 | 209 |
| | 101 | 132 | 5 | 238 |

Accidents are thus recorded to 212 trains, of which 65, or 30.7 per cent., were passenger trains, and 147, or 69.3 per cent., were freight trains.

Of two of the three broken bridges we have no particular information; the third was trestle used chiefly for switching coal and ore cars over.

The month was not unusually unfavorable for the season, but few storms being recorded of much severity, although the weather was generally cold.

The unpleasant features of the month were the large number of misplaced switches, causing no less than 19 accidents, 18 derailments and 6 collisions, and the five mail

accidents, of which four were caused by misplacing switches.

Probably the most noticeable feature of the record is the very large number of butting collisions, which are peculiarly accidents of management.

For the year ending with December the record is as follows:

| | Accidents. | Killed. | Injured. |
|--------------------------------|------------|---------|----------|
| January..... | 137 | 41 | 198 |
| February..... | 88 | 23 | 69 |
| March..... | 99 | 29 | 101 |
| April..... | 81 | 18 | 61 |
| May..... | 94 | 24 | 86 |
| June..... | 72 | 35 | 193 |
| July..... | 92 | 18 | 56 |
| August..... | 139 | 46 | 218 |
| September..... | 153 | 34 | 136 |
| October..... | 130 | 47 | 132 |
| November..... | 125 | 39 | 129 |
| December..... | 148 | 29 | 209 |
| | — | — | — |
| Total..... | 1,364 | 380 | 1,588 |
| Totals, same months, 1881..... | 1,458 | 414 | 1,597 |
| 1880..... | 1,078 | 315 | 1,152 |
| " " 1879..... | 910 | 185 | 609 |

The number of accidents in December was exceeded in but in one other month of the year; the number of killed was exceeding in six other months, but the number of injured is only one.

The averages per day for the month were 4.77 accidents, 0.94 killed and 6.74 injured; for the year they were 3.74 accidents, 1.04 killed and 4.35 injured.

The average casualties per accident were, for the month, 0.196 killed and 1.412 injured; for the year, 0.279 killed and 1.164 injured.

The averages per month for the year were 114 accidents, 32 killed and 132 injured, against similar averages of 122 accidents, 35 killed and 133 injured in 1881; 90 accidents, 26 killed and 96 injured in 1880, and 76 accidents, 15 killed and 51 injured in 1879.

Chicago & Northwestern Earnings.

For the first eight months of this company's fiscal year June 1 to Jan. 31, inclusive, the earnings from the several sources have been:

| | 1882-83. | 1881-82. | Inc. or Dec. | P.c. |
|--------------------|--------------|--------------|--------------|------|
| Passengers | \$4,224,188 | \$3,498,829 | I. \$725,366 | 20.7 |
| Freight | 11,872,050 | 12,617,566 | D. 745,516 | 6.0 |
| Express..... | 279,616 | 239,122 | I. 40,484 | 17.0 |
| Mails..... | 280,505 | 299,060 | D. 18,558 | 6.2 |
| Miscellaneous..... | 132,281 | 103,384 | I. 28,997 | 28.1 |
| Total | \$16,788,643 | \$16,757,800 | I. \$30,733 | 0.2 |

Thus, though the total earnings for the eight months were nearly the same in both years, there were great changes in the earnings from different sources. An increase of \$725,366 (20.7 per cent.) in passenger earnings was neutralized by a decrease of \$745,516 (6 per cent.) in freight earnings. It probably disappoints many that the considerably larger mileage this year has earned but \$30,733 more than last year, when the crops were so much better this year. But of the eight months since May included in this report, not more than five can properly be included in the present crop year for small grains, and only one in the corn crop year as far north as the territory where this company has lines. Further, last year was not a very bad one, but was on the whole an extremely good one for the Northwestern; the crops were not good, perhaps, but except in Iowa they were not very bad on this company's lines—not nearly so bad as everywhere further south. Its profit per share in that fiscal year was no less than \$14.40, and much the largest the company ever had.

This year there is a somewhat larger wheat crop on the company's lines in Minnesota and Dakota, and a much larger one elsewhere, and a very much larger corn crop in Iowa. But it has had the new wheat to carry for but five months of the eight, and the new corn but one month, and probably not much of it then, as the corn further south was in much better condition for marketing. Moreover, circumstances caused the grain to be marketed early last year, the January receipts at Chicago and Milwaukee being unprecedented. The first three months of this fiscal year—that is, the three summer months—were among the worst for shipments of grain and hogs that the company has ever had. These are the months when usually it has the largest corn traffic; last summer it carried very little corn. Great activity in other business and an exceptional immigration made the company's business reasonably large in spite of this; but for the three summer months the earnings compared as follows with the previous year:

| | 1882. | 1881. | Decrease. | P.c. |
|-----------------------------|-------------|-------------|-----------|------|
| June, July and August | \$6,258,950 | \$6,604,644 | \$345,694 | 5.2 |

Their was a period of bad earnings for other Northwest roads; but as we were then in the midst of an unusually large wheat harvest, and there was great confidence in the future, they attracted little attention, and at least had no influence on the market, prices of stock then going up rapidly. During these three months the Chicago, Milwaukee & St. Paul, also with a large increase of road, had almost the same amount of decrease as the Chicago & Northwestern.

Last month's traffic was much interrupted on these roads by snow blockades, and these sufficiently account for the decrease of \$64,877 (12 per cent.) in the Northwestern's January earnings. Thus of the eight months of the fiscal year three may be said to have belonged to a bad crop year for all grains, seven to a bad crop year for corn (which has become more important to this company of late because of its great extension of lines in Iowa), while in one other the traffic was seriously interrupted by the weather; and yet the company earned as much as in its most prosperous year, when its profits were \$14.40 per share. During four of the eight months (the first three and the last) the earnings were \$410,571 less than the previous year; during the other four (September to December, inclusive) they were \$441,253 more.

If anything were needed to prove that the decrease in

January earnings was due to inability to carry instead of lack of business offering, it may be found in the details of the earnings. There was an increase of 19½ per cent. in passenger earnings, of 31½ in express, of 11½ in mail earnings—all passenger train business. Passenger trains on all important lines are pushed through if possible; fewer freight trains are run; they cannot all be run. There was thus largely and perhaps wholly due to this a decrease of 27 per cent. in freight earnings in January.

So far as farm produce is concerned it is absolutely certain that this road must carry much more during the rest of the crop year than last year. The crops on its lines are not extraordinary, but, especially in Iowa, they are very much better than last year. The blockading of a road has very little effect on its aggregate freight traffic for the season; if the wheat and corn cannot go forward in January or February, it will go forward none the less later in the season. Some of the passenger traffic is an absolute loss in such seasons; but so far passenger traffic has not suffered much—in the last week of January it was 40% more than last year. What is really a more serious matter is the increase of working expenses at such times; but half the load, perhaps, can be taken with the same motive power and trainmen, large expenditures must be made for clearing the tracks, and there is great destruction and wear of rolling stock.

What is said here of the Northwestern is true, both as regards traffic and interruptions by snow, of the other Northwestern roads, though it is the northernmost of the important corn carriers, and the lines further south have no such serious difficulty with snow—scarcely ever have branches on which traffic has to be abandoned entirely for a time. What traffic there is in the country they will carry later if not now; and they cannot fail to have more farm produce than last year to carry. As to west-bound freight—lumber and merchandise—we cannot be so sure; the movement of it was large last year in spite of bad crops, and at times it has not been large this year in spite of good crops.

Strength of Cast-Iron Wheels.

The following test of the strength of cast-iron wheels, which was made on one of our leading roads, will be of interest in connection with the editorials on the same subject in the *Railroad Gazette* of this week and last.

Sixty-four cast iron wheels were made of "all new iron," the mixture consisting of 300 lbs. Lanesboro pig, No. 4, with 275 lbs. Lake Superior pig, No. 4. The test was made by breaking it with a 35-lb. sledge while standing on its tread and flange on a clay road-bed, with the following results: 89 blows on outer edge of tread broke out a ragged piece 1½ in. wide by 4 in. long, running out to small points at each end. The wheel was then laid with its cracked side down, and struck 166 blows on the plate, midway between the hub and the fracture made on the tread, without breaking it. To weaken the outer rim of the wheel, a similar piece was broken out of the flange opposite the same point of the broken tread, and 48 blows on the plate were then added to the 166 before it gave way. The fracture was ragged and the broken piece difficult to remove, indicating a tough iron. Similar tests of wheels made of part scrap or old material would be of interest in connection with the discussion of this subject.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

East Tennessee, Virginia & Georgia.—The Ohio Division is extended northward to the Kentucky state line, 5 miles. Gauge, 5 ft.

This is a total of 5 miles, making 10,584 miles so far reported for 1882.

New track is reported laid in the present year as follows:

Pennsylvania, Slatington & New England.—Track laid from Portland, Pa., on the Delaware River, west to Pen Argyle, 11 miles; also from Deckertown, N. J., to Balaeville, 7 miles.

This is a total of 18 miles, making 79 miles thus far reported for 1883, against 192 miles reported at the corresponding time in 1882, and 110 miles in 1881.

THE CHICAGO, MILWAUKEE & ST. PAUL COMPANY has issued a statement of its earnings, working expenses, etc., for its immense system during the year 1882. This is a property which is very difficult to judge, because it has been growing so fast that there is comparatively little value in comparisons of one year with another. For instance, the length of road worked at the end of 1881 was 4,260 miles, but the average worked during the year was but 3,830 miles—very little more than the year before. Last year the average was about 4,280 miles, nearly half of which is not three years old, and part of it (as the Council Bluffs line for passenger traffic) is not fully opened yet. The effect of the new lines on earnings, and especially on profits, cannot be estimated with any accuracy, except by those familiar with the traffic of those lines individually.

The earnings and expenses of the system for the last two years have been:

| | 1882. | 1881. | Increase. P.c. |
|-----------------------|--------------|--------------|------------------|
| Average miles worked. | 4,280 | 3,830 | 450 11 7 |
| Gross earnings..... | \$20,386,726 | \$17,349,573 | \$3,037,153 17.5 |
| Expenses..... | 12,186,073 | 10,317,931 | 1,868,142 18.1 |

Net earnings..... \$8,200,653 \$7,031,642 \$1,169,011 16.6

Besides the earnings from traffic, the company received cash for sales of lands amounting to \$1,014,228 last year, against \$811,196 in 1881. The rate of increase in gross earnings and profits therefore was considerably greater than that in mileage, and if the increase had been wholly

due to the new road, its average earnings per mile would be \$675 gross and \$260 net—probably more than twice as great as they actually were. The average gross earnings per mile for the whole system increased from \$4,530 in 1881 to \$4,763 in 1882. The gain must have been due to the greater activity in business throughout the system, the heavy immigration, etc., as the new lines could not fail to reduce the average earnings per mile of road. If the new line to Omaha had been open throughout the year this might not be true. It by itself will doubtless have larger average earnings per mile than the rest of the system; but it was open for freight only two or three months, and is not yet fully open for through passenger traffic.

The net earnings of the system per mile of road increased from \$1,836 in 1881 to \$1,916 in 1882. Both gross and net earnings per mile are still very small—the Northwestern in its last fiscal year earned \$7,800 gross and \$3,612 net; the Manitoba, most of which is new, earned \$7,159 gross and \$3,363 net. The St. Paul company is prosperous only because it has a very light capital account. Its payments on interest account last year were only about \$1,180 per mile worked, and recent additions to its system have brought an interest charge of only \$750 to \$1,000 per mile. Altogether the company has more undeveloped or half developed road than any other in the country, and when it is developed an enormous increase in earnings and profits may be expected.

The rate of its development depends on circumstances which cannot be clearly foreseen. It has been rapid for two or three years, and the circumstances now seem favorable to rapid growth another year at least. With the country on all the new lines in Iowa, Minnesota and Dakota tolerably well occupied, there must be an enormous increase of the company's business; lines which now earn \$1,000 or \$2,000 a year are almost sure some day to earn \$5,000, and some of them much more. The time when is the one uncertain thing.

GRAIN AND FLOUR EXPORTS from the Atlantic ports for the eight weeks ending Jan. 31 for three successive years have been:

| | 1880-81. | 1881-82. | 1882-83. |
|------------------|------------|-----------|-----------|
| Flour, bbls..... | 1,160,762 | 455,345 | 1,596,278 |
| Wheat, bu..... | 11,441,782 | 5,368,625 | 9,634,914 |
| Corn, bu..... | 5,535,151 | 3,364,610 | 5,795,105 |

Total flour and grain, bu..... 22,607,402 11,061,498 23,060,732

The increase this year over last is equivalent to nearly 12,000,000 bushels, or 109 per cent., and the exports this year are a trifle greater than in the winter of 1880-81 even. The wheat exports are less than two years ago, but the flour exports are so much greater as to more than make up for it, flour and wheat together amounting to 16,818,165 bushels this year, against 7,417,077 last year and 16,665,211 bushels in 1880-81. Corn exports seem now to be fully resumed, being larger in the eight weeks than in the corresponding period of 1880-81; and 70 per cent. of the corn exports this year were made in the last four of the eight weeks. The exports of the last four weeks, 4,055,000 bushels, were not more than the average January corn exports since 1875, however. Our average corn exports from 1876 to 1881, inclusive, varied from 5,612,000 bushels a month in 1876 to 9,780,000 in 1880, falling to 6,040,000 in 1881 and to 1,282,500 bushels in 1882—to 808,247 in the last half of 1882. The exports of corn in the last half of the year are not usually so much less than in the first half. For seven successive years the percentage of the year's exports which was exported in the last half of the year was:

| 1876. | 1877. | 1878. | 1879. | 1880. | 1881. | 1882. |
|-------|-------|-------|-------|-------|-------|-------|
| 48.0 | 47.0 | 39.6 | 41.3 | 47.0 | 45.3 | 34.0 |

The exports have always culminated in the three months, May, June and July, though the March and April exports have sometimes been enormous—24,000,000 bushels in the two months in 1882, and 16,400,000 in 1881. The circumstances favor large exports in the spring months this year—that is, there is a short supply abroad. Whether we have as much to spare as in previous years remains to be seen; we do not think we have; but there is enough to make the exports very large in the first half of the year.

Baltimore now ships a very large share of the grain exports, and they are largely corn, and the exports of Philadelphia and New Orleans are now chiefly corn. Last year they exported scarcely any corn, but previous to 1878 they exported little else. There have been two or three weeks this winter when the total grain exports from Baltimore were larger than those from New York, though its receipts are always much less. New York, however, exports usually ten or fifteen times as much flour as Baltimore.

THE OVERLAND COTTON MOVEMENT, including shipments from the South by rail or by river and rail directly to Eastern mills or ports north of the Potomac, are reported by the *Commercial and Financial Chronicle* to have been for the five months of the cotton year from Sept. 1 to Feb. 1 770,339 bales this year, against 766,222 last year, and 648,327 in 1880-81. As the crop this year was much greater than last, and the sea-board receipts so far have been 14 per cent. greater, this shows that a smaller proportion of the cotton than last year has come by this long interior route—very likely because the rail rates were lower last year.

The shipments from the principal river crossings were, in bales:

| | 1882-83. | 1881-82. | 1880-81. |
|----------------------|----------|----------|----------|
| St. Louis..... | 264,619 | 241,668 | 224,943 |
| Above St. Louis..... | 88,192 | 83,060 | 110,986 |
| Cairo..... | 154,653 | 118,217 | 83,197 |
| Louisville..... | 118,026 | 151,057 | 112,842 |
| Cincinnati..... | 71,069 | 139,672 | 77,286 |

The fluctuations at the different crossings are trifling compared with those in the shipments by the different railroads. Thus while compared with last year there is a decrease of 82,481 bales (21½ per cent.) in the total Louisville shipments,

there is an increase of 30,394 bales (222 per cent.) in the shipments thence by the Ohio & Mississippi, a decrease of 29,589 (45 per cent.) by the Jeffersonville, Madison & Indianapolis, and a decrease of 33,238 (41½ per cent.) by the Louisville, Cincinnati & Lexington. And the Cincinnati Southern, which carried 97,927 bales to Cincinnati last year, has brought but 54,139 bales this year.

The seaboard receipts from Sept. to Feb. 2 have been:

| 1883. | 1882. | 1881. | 1880. | 1879. | 1878. |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 4,319,947 | 3,787,538 | 4,116,544 | 3,863,664 | 3,441,348 | 3,254,879 |

The crop last year was light, but the year previous it was the best ever raised, unless it may have been exceeded this year.

The exports for the same period were 2,825,711 bales this year, against 2,011,703 last year, an increase of 814,014 tons, or 40 per cent.

The greatest change in receipts this year is at Galveston, where there is a gain of 258,242 tons, or 72 per cent. All the Gulf ports have gained largely; the South Atlantic ports have gained, but not largely, except Norfolk. The figures are:

| 1882-83. | 1881-82. | Inc. or Dec. | P.c. |
|---------------------------|-----------|--------------|------|
| Gulf ports..... | 2,041,461 | 1,577,761 | 22.4 |
| South Atlantic ports..... | 1,988,927 | 1,878,409 | 6.0 |
| Norfolk..... | 277,559 | 331,308 | 16.2 |

This year 47.3 per cent. of the whole went to Gulf ports, against 40.9 per cent. last year.

THE CHICAGO, BURLINGTON & QUINCY, the Chicago Tribune says, will make its interchanges of Pacific freight with the Denver, Rio Grande & Western as soon as that road is completed to Ogden, which is announced for April 1, but will probably be later. The announcement is made as if this would be the exclusive connection of the Burlington road—as if it would discontinue interchanges with the Union Pacific. This seems improbable. The Burlington will doubtless interchange traffic with the new road from Denver to Ogden—will carry all the traffic the latter will bring it, and deliver it a somewhat corresponding amount in return. If it could carry its entire share of the through Pacific traffic by this route without losing any part of the local traffic interchanged with the Union Pacific, it would be greatly to its advantage, as it gets a haul of 1,053 miles on the traffic going by Denver, and only 498 miles on that going by Council Bluffs and the Union Pacific. But the Union Pacific delivers a large amount of traffic at Council Bluffs, besides the through Pacific traffic, which latter is by no means the bonanza which many suppose it to be. The Burlington gets an equal share of this traffic with the other roads to Council Bluffs, and it will not endanger this by an exclusive arrangement with another road, unless that other road is sure to bring it corresponding advantages. Still the Burlington and the Union Pacific already compete for a large part of the local traffic west of Missouri. To say nothing of Nebraska south of the Platte, where the Burlington has a great net-work commanding much more of the traffic than the Union Pacific, its Denver extension is accessible to all the cattle of the plains country that were formerly shipped by the Union Pacific, and competes at Denver for the whole Colorado traffic. With the Denver & Rio Grande opened to Utah, it can compete with the Union Pacific for a large part of the Utah traffic (not the whole, because the Union Pacific controls nearly all the Utah railroads). With the new line open it would seem that its traffic would have to be included with that of the Union Pacific in the Iowa pool, if that is to be maintained on its old basis.

CHICAGO TO SAN FRANCISCO VIA NEW ORLEANS is a route over which through tickets are now issued, and is an example of the circuitous routes which are sometimes cultivated by railroad companies in order to get "a share of the business." From Chicago to San Francisco by way of Council Bluffs is 2,356 miles. To New Orleans the distance from Chicago is just about the same as to New York—915 miles. But when the passenger has made this long journey, requiring 38 hours' time, he is 2,492 miles from San Francisco. But rates are made the same by both routes, and if the division of the rate is such as to give the road from Chicago to New Orleans a profit on the passenger, of course it is to its advantage to accept the business, for it cannot possibly get any of the travel by way of Council Bluffs—though it would seem about as reasonable to ticket people from Chicago via St. Louis to Council Bluffs and San Francisco, as via New Orleans and the Southern Pacific. Probably no tickets could be sold via St. Louis, while there probably are people who wish to get the largest amount of travel for their money—to see many and various kinds of country—who will take the New Orleans route and go a round thousand miles out of their way. Unusual efforts seem to be made to cultivate business by the Southern Pacific, which is indirect for most of the country which has much business with the Pacific coast; for the South buys very little of what comes from that coast, and produces or imports scarcely anything of what goes to it. For Southern California, it is true, the route is much less indirect than to San Francisco and Northern California; and Southern California is perhaps growing faster than the rest of the state.

THE FIRST CROP REPORTS for the coming harvest have come in, and regard the acreage and condition of winter wheat in Illinois. The state authorities divide the state into three divisions, northern, central and southern, each with about 34 counties. Except in the southern tier of counties of the northern division very little wheat is grown, but usually more corn than in either of the other sections. In the central much more wheat is grown than in either of the other sections, more than half the total in the state sometimes, and also a great deal of corn. In the southern section

the total area cultivated is much less than either of the two others, a considerable part of it being entirely unlike the rest of the state, wooded and often hilly and without prairies. It usually has more than one-third of the wheat acreage of the state, however; last year it had about one-seventh of the corn acreage. The neglect of the authorities to sum up the results for the whole make their reports valueless to most people, as there are no records which give acreage and production for the separate divisions of the state.

The report shows that the area of winter wheat sown this year is 1 per cent. less than last year in the northern third of the state, 8 per cent. more in the central third, and 5 per cent. more in the southern third. But last year the acreage was 10 per cent. less than in 1881. The total acreage is probably 5 1/2 per cent. more than last year and 5 per cent. less than in 1881. The condition is reported 2 per cent. below that last year at this time in the northern division, a very little better in the central divisions and 16 per cent. worse in the southern division.

THE CHICAGO BOARD OF TRADE, in reply to the communication of the railroads to the East announcing that they withdrew their agents from the Board because it interpreted its rules as requiring roads represented on the Board to submit its transactions with members to arbitration, says that it does not require any railroad to do this, and that in fact it has no rule which compels members even to submit to arbitration. It then recounts the circumstances of this particular case, in which the Pennsylvania Company was condemned and deprived of the privileges of the Board. It says that its Board of Directors recommended arbitration in case of a complaint made by a shipper; that the company would not accept its recommendation, but intimated that the person complaining must seek his remedy in the courts. This, it says, is a position which would not be tolerated in a member of the Board, and all doing business on the Board by the conditions of their admission are subject to the same discipline as members.

This communication seems to contradict itself flatly. The Board requires no one to submit differences with members to arbitration, but if its directors recommend arbitration, arbitration must be accepted, under penalty of expulsion. If the communication means any thing, it is that persons doing business on the Board need not submit their differences to arbitration, except when the Board (or its directors) asks them to. And we are still in doubt whether the suspension of the Pennsylvania Company was due to its refusal to arbitrate or to the belief of the directors that it had been guilty of a peculiarly aggravated case of denial of justice.

THE WINTER HOG PACKING is now not much behind that of last year, which was, for the whole season from Nov. 1 to March 1, 17 per cent. less than the year before, 23 per cent. less than in 1878-79, and the smallest since 1877. For the first three of the four months the packing this year has been about 2 per cent. less than last year. Chicago maintains its usual pre-eminence, packing 42 1/4 per cent. of the whole; and there are no very great changes at the other leading packing points, unless it is that Kansas City has become more decidedly a leading point, ranking third this year (fifth last year), and gaining 18 per cent. over last year, as it ought to do with the magnificent Kansas corn crop. That it did not pack more was evidently for lack of hogs to fatten, and not from lack of corn to fatten them, as last year. In Iowa, where we should expect this business to increase, eight different places report an aggregate of 234,934 hogs packed this year, against 218,311 last year—only 7 1/2 per cent. increase; and the total is a fourth less than the packing of Kansas City alone.

The exports of hog products this year for the season have been 11 per cent. less than last year. Prices are high, and evidently we have no great surplus pressing for export.

THE SCRAP HEAP.

Locomotive Building.

A fire broke out in the Grant Locomotive works in Paterson, N. J., on the evening of Feb. 1, which destroyed the tank-shop, a frame building adjoining the boiler shop. The fire was confined to the tank shop, and the adjoining buildings were not injured. The loss is about \$20,000, partly covered by insurance. The fire will not delay the work now in progress in the shops. These works have just completed 10 mogul freight engines for the New York & New England road.

The Schenectady Locomotive Works in Schenectady, N. Y., have orders on hand for 20 eight-wheel freight engines for the Chicago & Northwestern and 15 for the Chicago & Alton; 6 eight-wheel and 2 consolidation engines for the Kentucky Central; 6 ten-wheel freight engines for the Chesapeake, Ohio & Southwestern, and 15 consolidation engines for the Fall Brook Coal Co., to be used on the Jersey Shore, Pine Creek & Buffalo road.

The Canadian Locomotive & Engine Co. in Kingston, Ont., is building a number of locomotives for the Canadian Pacific road.

Car Notes.

The Jackson & Sharp Co. in Wilmington, Del., has just shipped 10 passenger cars for suburban traffic to the Illinois Central, 4 first-class passenger cars to the Florida Central & Western, and an equipment of narrow-gauge passenger cars to the Jacksonville, St. Augustine & Halifax River road. The company has recently booked orders for a number of parlor cars for the Woodruff Co., and also 20 passenger cars for the Delaware, Lackawanna & Western.

The New York, Ontario & Western shops in Middletown, N. Y., are building a number of new box cars and several cabooses, and are rebuilding some passenger cars which were originally built for excursion travel to the Centennial. It is said that the Griffin Car Wheel Co. of Detroit, will establish a branch foundry in Buffalo, N. Y., in the building formerly used by the Buffalo Iron Works at Black Rock.

The Jones Car Works in Schenectady, N. Y., are building a number of passenger cars for the Chicago & Northwestern,

and also a number of sleeping and drawing-room cars for the Wagner Co.

The Philadelphia & Reading shops in Reading, Pa., have just turned out a complete new train, consisting of a baggage, an express, a smoking, a parlor and two passenger cars.

The Pullman shops at Pullman, Ill., are to build 600 box cars for the New York, West Shore & Buffalo road.

The New York Central & Hudson River shops at West Albany, N. Y., are building one passenger, 2 combination and 13 baggage cars for the road.

The LaFayette Car Works in LaFayette, Ind., last year built 1,547 box, 1,035 coal, 440 flat and 54 caboose cars, making 3,076 cars in all, an average of 50 a week.

Besides orders heretofore noted, the Wason Manufacturing Co. at Brightwood (Springfield), Mass., is building passenger cars for the Providence, Warren & Bristol, the Maine Central, the Portland & Ogdensburg, the Southeastern, of Canada, and the St. John & Maine; also 50 stock cars for the Connecticut River road.

A dispatch from Ottawa, Feb. 5, says: "The proprietors of the Ontario Car Works, at London, Ont., are said to have made representations to the government that railway cars are being systematically smuggled into Canada from the United States. It is alleged that large numbers of cars are brought across the line loaded and never returned, and in due time the letters indicating the ownership of such cars are effaced. It is estimated that American-built cars to the value of \$450,000 have found their way into the Dominion in this manner, and are now in use on the various Canadian roads."

Bridge Notes.

Messrs. Cofrode & Saylor, of the Philadelphia Bridge Works at Pottstown, Pa., have taken the contract to build a double-track iron bridge over the Connecticut River at Holyoke, Mass., for the Connecticut River Railroad. The bridge will have five spans of 152 ft. each, and will replace a Howe truss bridge now in use. It will rest on the present piers and abutments, and the builders will have to take down the old bridge and erect the new one without stopping traffic on the road.

Clark, Reeves & Co. at Pheanixville, Pa., have a contract to build several iron bridges for the Rochester & Pittsburgh road.

The Corrugated Metal Co. at East Berlin, Conn., has decided to change its name to the Berlin Iron Bridge Co. The capital stock has been increased to \$100,000. The company last year paid 8 per cent. dividend, and carried 10 per cent. to the surplus fund.

The Wrought Iron Bridge Co. in Canton, O., has taken the contract for a high way bridge over the Rappahannock River at Fredericksburg, Va. The contract price is \$24,150 for the superstructure.

Iron Notes.

The Union Iron & Steel Co., of Chicago, has been placed in the hands of a receiver, on application of Amasa Stone, of Cleveland, who is a large creditor. In his application to the Court Mr. Stone alleges that expenditures on construction account were made on credit and beyond the capital of the company, and this, with the shrinkage in values caused the failure. He believes that if the company's affairs are properly managed it can pay all its debts and leave the stock intact. The Court appointed Addison L. Griffin, Vice-President of the company, Receiver.

The Kansas Rolling Mill at Rosedale, Kan., has been closed, and the trustees under the mortgage have taken possession of the works. The liabilities are stated at about \$600,000, and it is believed that the assets will cover them. The mills have been making iron rails, rail-fastenings, etc.

The rolling mill of the Keystone Iron Co. in Reading, Pa., has shut down, the employees not being willing to accept a reduction in wages.

The rolling mill of the Reading Iron Works in Reading, Pa., has started up, after a stoppage of six weeks, and is now running full double-turn.

Quinnimont Furnace at Quinnimont, W. Va., was sold recently at public sale, and bought for \$150,000 by John F. Hartranft, of Philadelphia, and associates.

Lucinda Furnace at Norristown, Pa., has gone out of blast, the reason given being the difficulty of obtaining a regular supply of coal.

A dispatch from Gore, O., of recent date, says: "A consolidation of five of the largest iron companies of the Hocking Valley with two of the largest coal companies into one company and under one management is to take place within a day or two. The Crafts Iron Co., Thomas Iron Works, Winona Iron Co., Bessie Furnace and Akron Iron Co., and the Thomas Coal Co. and Longstreth Coal Co. will form the new syndicate."

The Phoenix Iron & Manufacturing Co. in Trenton, N. J., is at work on contracts for iron work for the new post-office buildings in Boston and Philadelphia.

The Safe Harbor Iron Works near Lancaster, Pa., have shut down for the present.

The Edgar Thomson Steel Works near Pittsburgh have taken a contract for 10,000 tons of steel rails for the Terre Haute & Indianapolis road.

Manufacturing Notes.

The American Brake Co. of St. Louis, has just closed a contract to put its automatic freight brake on 100 cars, and driver-brakes on several locomotives on the New Haven & Northampton road. The company will also equip with its brakes an experimental train on the Connecticut River road. This is the first introduction of the company's brakes in the East. A contract has lately been made to put driver-brakes on 100 engines for the Ohio & Mississippi road.

The Schultz Belting Co. in St. Louis recently made a heavy shipment of machine belts to France, to fill an order.

The Yale Lock Manufacturing Co. in Stamford, Conn., is building six large power traveling cranes. The largest has a span of 72 ft. and will lift 15 tons.

The new factory of the Standard Nut Works in Pittsburgh has been started up and is running night and day. There are 10 machines at work and 10 more are nearly ready to start.

The Rail Market.

Steel Rails.—The market is quiet and quotations continue nominally at \$40 per ton at mill. A lower price is taken for desirable orders, and one sale of 5,000 tons of 65-lb. rails is reported at a little less than \$39 at mill, cash, delivery every month as wanted.

Rail Fastenings.—Spikes are quoted at \$2.80 per 100 lbs. in Pittsburgh, with fair demand. Fish-plates or splice-bars are quoted at \$2.37 to \$2.50 per 100 lbs.; track-bolts, \$3.50 to \$3.75 for square and \$3.75 to \$3.90 for hexagon nuts.

Old Rails.—There are no large sales of old iron rails reported, and Philadelphia quotations are nominal at \$27 per ton for tees and \$27.50 to \$28 for double heads. Steel crossties are held at about \$22 per ton, with no sales at that price.

A Welcome to Car-Coupler Inventors.

An exchange says that a Western superintendent has devised a method of treating with car-coupler men which

has proved eminently successful. His plan is illustrated as follows:

Office of Superintendent. Enter man with model.

"I have here, Mr. Superintendent, an automatic coupler, which combines all the advantages and avoids all the defects of previous inventions," etc., etc., until Superintendent breaks in briskly:

"Certainly, certainly, capital thing, I have no doubt. May be just what we want. Now I'll tell you what we'll do. Just go down into the yard and find the foreman—anyone will show him to you—and give him this card. He'll give you a couple of cars and you can put your coupler right on and give it a trial."

Inventor is overjoyed, and starts for the yard at once, when Superintendent stops him. "One thing first, please; your name and your wife's address and \$25 deposit."

Inventor is puzzled; "Address—\$25 deposit—may I ask what for?"

Superintendent—"Well, the \$25 is to cover expense of a box and express charges on your body home. You see the company used to pay for all that, but we had so many dead car-coupler men to forward that the directors kicked at the expense, and now we have to ask for the deposit in advance—that's all. But go right on down and find the foreman."

Inventor goes right on down, but takes first train out of town.

The President's Salary.

One of the stockholders of a new Western railroad was a farmer who had accumulated his money by hard toil, and when he had put in an appearance at the meeting to elect a board of directors he felt it his duty to remark:

"Gentlemen, as I understand this thing, we elect the board and the board elects the officers."

Some one said that he was right, and he continued:

"I don't go a cent on high salaries, and I want that understood. I am in favor of paying our president a good living salary, and no more."

"How much do you call a good living salary?" asked one of the crowd.

"Well, \$2 a day is the going wages, but—"

Here the meeting began to roar, and it was two or three minutes before the orator had a chance to conclude.

"But of course we want a man who can run an engine, switch a train, handle freight, keep books and lick anybody who won't pay fare, so I shall not object to \$2.50 a day."

Detroit Free Press.

A Portable Track Transfer Elevator.

Messrs. Richardson, Trimmer & Loomis, two of whom are connected with the Chicago Division of the Pittsburgh, Cincinnati & St. Louis Railway, have designed a transfer car, intended to transfer grain from one car to another, just as the floating elevators so commonly used in harbor transferred grain from one vessel to another. The inventors obtained their patent last May, but only within the last three months have had a car in operation (at Chicago). It consists essentially of a small elevator run by a ten horse-power engine (which also moves the car) and of a sheet-iron bin with a capacity of 40,000 lbs. of corn or a full car-load of any grain except, perhaps, oats, connected with a Howe scale, the whole inclosed in a box car 15 ft. high, having two chutes, one for receiving, the other for delivering the grain. The transfer requires three tracks, the transfer car moving on the centre track. The receiving chute, which is on a line with the bottom of the car and has adjustable folds and an adjustable roof for protection in case of rain, being connected with the grain doorway of a loaded car, about one-third of the grain will run down to the elevator, while the rest must be shoveled to it, requiring the work of three men for about six minutes. The grain being in the bin of the transfer car, it is weighed and transferred by the same buckets that brought it in, transferred to the mouth of the delivering chute, which is nearly on a line with the top of the receiving car, so that nearly one-third of the grain loads itself without further assistance, the remaining two-thirds requiring the labor of three men for about six minutes. The labor of loading and unloading such grain as oats in the summer is of the severest character, men sometimes refusing the job on hot days, or quickly giving it up if undertaken. One Chicago road last summer is said to have hired 100 to 250 men in a single hot day, the laborers ceasing about as rapidly on trial as the supply of new men to the work. The total time for transfer of a car-load of grain by the transfer car, including movement from car to car and adjustment of chutes, is represented to be about 15 minutes, and the estimated cost is 35 cents.

In 1881, 88,512 cars of grain received at Chicago were transferred to connecting roads without passing through a Chicago elevator; most of this, doubtless, was forwarded in the cars in which it was received, but a large amount was transferred from the cars of the Western to those of the Eastern roads. The transfer car gives the advantage of weighing the grain by itself, and not in a car, as the weight of a car varies considerably from the weight stenciled on it, according to its dampness, etc.

Use of Fusee Signals at Night.

General Manager S. M. Felton of the New York & New England road has issued the following circular order in relation to the use of fusee signals on passenger trains:

As an additional protection to passenger trains detained or making slow progress on the road, the flagman of every passenger train will be provided with hand and standard fusee signals, the former to be carried in the hand and burning but five minutes, the latter burning ten minutes and to be left on the track. These signals are to be used only after night or during storms, as follows:

"1. When a passenger train is delayed, or loses time between stations from any cause, so that rear of train will be in danger from a following train, the flagman will at intervals drop off a standard fusee, in accordance with the instructions printed on each signal, as follows: 'To ignite the fusee, put on the cap and strike the end (plumb down) on any hard substance; hold the fusee for a moment or two to insure perfect ignition; and if to be thrown off the train let it drop so as to avoid needless concussion. The caps can be carried on the handle, until the fusee is to be used, when the cap must be removed and placed on top of fusee.' When thrown off the train the fusee must be dropped in the middle of the track, and in such manner that the sharp point will penetrate a cross-tie or the ground, and hold fusee in an upright position."

"2. Engineers observing these burning signals must bear in mind that they indicate a passenger train has passed that point less than ten minutes in advance of them; they must immediately bring their train to a full stop, and then proceed at such a speed that they can be stopped within sight of, and before reaching, any train preceding, and run at such rate until definite information is obtained in regard to train which left the signal."

"3. Hand (as well as standard) fusees must be carried by flagmen sent to stop approaching trains, as above indicated, and are to be used in case a lantern is broken, a light extinguished, or in emergency, care being taken not to light one until a train is seen or heard approaching, as they will burn but five minutes. When a flagman is called in from signaling a following train, and has not had time to go back the prescribed distance, he will leave a standard fusee burning,

as a danger signal, in addition to the usual precaution of placing torpedoes on the rail.

"4. Conductors will be held responsible for the strict observance of these rules. They must see that their flagmen fully understand them; that they keep on hand a supply of 5 fuses of each kind at all times, replenishing their stock as fast as used; and be sure that sufficient precautions are taken to insure perfect safety from any following trains.

"5. Conductors will make requisition on the Superintendent for a supply of these signals. They must report promptly each and every case where one is used, stating place and cause."

Left by the Train.

We have been asked time and again how it is that so many people get left by the trains that go out of Austin. It is a very complicated matter, and we are not sure that we are equal to the task, but we will try. One reason is because they are not aboard the train. There are two public clocks in Austin which are usually from 20 minutes to three-quarters of an hour ahead of each other. One of these clocks keeps railroad time, but nobody knows which one of the two clocks it is. The man who wants to leave Austin, say on the 11 o'clock train, must first find out which clock keeps railroad time. After he has satisfied himself on that point, he will have to go to the depot from 15 minutes to half an hour before or after 11 o'clock, because the trains do not run on Austin railroad time, but according to St. Louis railroad time. If the would-be traveler understands algebra, he might cipher it out, or he can, if he sees proper, telegraph to St. Louis. That is one successful way to get left. Another, and a better way, is for you, if you don't care to miss the train, to go to the railroad depot and ask what the schedule time is. As no train has ever yet arrived on schedule time, you will know for certain one time of day when the train will not arrive. Having gained that point, you must ask one of the employés how much behind time the train is, and if he says an hour, then you come back in two hours, and you will hit it; provided the employé hasn't lied about it. Usually the blackboard at the railroad office tells you precisely how many hours the train is behind time, but as the figures are only changed once a week, they are not reliable, except by accident. However, the train always arrives when it gets here, and by going to the depot a day or so before you want to leave, and camping there until the train does arrive, you will be all right, if you don't take the south-bound train instead of the north-bound train, or vice versa. As it is impossible to find out which is which, and as it is rather difficult for one man to travel on two trains going in different directions, the only really safe way not to miss the train is to walk. The man who has a walk-over cannot be left.—*Texas Settings*.

The Shaw Locomotive.

At a meeting of the Engineers' Club of Philadelphia, held Jan. 20, Mr. Wm. E. Lockwood, introduced by the Secretary, presented a full description of the Shaw locomotive, profusely illustrated by magic lantern, working model, etc., etc.

The Shaw locomotive may be classed as a 37-ton soft coal passenger engine with two cylinders on each side, each 10 $\frac{1}{2}$ by 24 in., the two working in combination, being equivalent to one cylinder 14.85 by 24 in.; two cross-heads; two piston rods; two connecting and parallel rods on each side.

Her drivers are 5 ft. 9 in.; weight of engine, 37,000 lbs.; coal and water, when in use, 7,300 lbs.; total, 44,300 lbs. Weight of tender, 26,000 lbs.; water, 15,000 lbs.; coal, 6,500 lbs.; total, 47,500 lbs. Total combined, ready for use, 121,800 pounds, or 60.45 tons.

The improvement in engines claimed in the Shaw locomotive are:

First—No counterbalanced drivers; ergo, no hammer blows and no nosing around.

Second—A single movement of valve with duplex action.

Third—Steam is the motor of balance as applied to the reciprocating parts.

Graphical Determination of Centre of Gravity.

At the last meeting of the Engineers' Club of Philadelphia, Mr. Wilfred Lewis exhibited a machine for the graphical determination of centre of gravity and moment of inertia of planar areas. The figure to be calculated is drawn to a suitable scale and placed in the machine, where the outline is followed by a tracing point in order to produce, upon another piece of paper, a figure whose area shall be proportional to the statical moment of the given figure about an assumed axis. If now the second figure be followed by the tracing point and a third figure be drawn, its area will be proportional to the moment of inertia, and from the areas thus drawn can be found, by simple arithmetical processes, the centre of gravity and moment of inertia.

The machine is intended for application to such figures as cannot readily be solved by the usual methods, such as deck beams, steel rails and castings with round corners, large fillets and curved sides, which can only be approximately solved by long and tedious integrations. A planimeter is used to measure the areas and it is thought that by this graphical method more accurate results can be obtained with less work and without so much probability of error in the operations. The machine can also be made use of to determine the centents of any solid of revolution or its radius of gyration.

Wholesale Prices in Mexico.

The introduction of railroads and Yankee enterprise into Mexico is drawing the attention of the outside world to the easy-going, jog-trot sort of life that is lived there. It is a land where the sewing machine, the telephone and the book-agent are as yet unknown, except in rarely-favored localities. As an illustration of the quaint yet exasperating backwardness of the people, the following incident is related as having recently happened: A railroad official in the state of Cuihahua advertised for a number of railroad ties. Among those who responded to the demand was an enterprising Mexican, who expressed his ability to supply these articles. "How many can you supply?" asked the railroad magnate. "Excellenza can have as many as he will," replied the Mexican with an expressive shrug. "Well, if we should want 500 ties, what would they cost us?" After some complicated figuring and much pantomime the Mexican announced that he could supply that number at the rate of 50 cents apiece. "And suppose we should want 5,000?" inquired the official. "Holy Madonna! that is a large order," answered the native; "I must charge at least 75 cents apiece." He was then laughingly asked what price he would deliver 500,000 for. And after more pantomime calculations he solemnly announced that for such a tremendous order as that he would have to charge at least \$2.50 apiece for the ties.

Singular Accidents.

A correspondent of the *Chicago Tribune*, writing from Des Moines, Ia., Jan. 29, tells the following pretty tough yarns: "The Des Moines & Fort Dodge road takes the cake for unheeded train accidents. The other day a freight train was coming down the road in which were several cars of hogs. Between Waukeen and Ashawa the engineer felt a disagreeable jerky motion of the train, and whistled down brakes. The rear truck of the second car in the train was missing, and the hogs were piled in a heap at the fallen end of the car making a most terrific

squeal. A brakeman went back a mile and a half, but could not find the missing truck. A passenger-coach was attached to the train, in which were five women, a babe and ten men. The women and baby were stored in the engine-cab, the men in the first car with the hogs, and brought to the city."

"A few years ago a freight train was going north on this road and while halting at a station the forward trucks of a car were discovered missing, the car being held up by the coupling. A run back of six miles found the truck down in the ditch, sound as a dollar. How the truck got off the track without derailing the train is a mystery not yet solved."

"Last Sunday the Chicago & Rock Island had a singular accident from a broken rail. An engine and six freight cars loaded passed over the break, five empty cars jumped the track and cleared the roadbed, the remaining cars of the train crossed the break and closed up with the forward section—at least that is the way the train went into the first station, where the trainmen found the train five cars short, which were traced back to the ditch."

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

Boston & Albany, annual meeting, at the Meiona in Boston, Feb. 14.

Burlington, Cedar Rapids & Northern, annual meeting, in Cedar Rapids, Ia., Feb. 27. Transfer books close Feb. 10.

St. Louis & San Francisco, annual meeting, at the office in St. Louis, March 13.

Union Pacific, annual meeting, at the office, No. 195 Broadway, New York, March 7, at 10 a. m. Transfer books close Feb. 19.

Wabash, St. Louis & Pacific, annual meeting, at the office in St. Louis, March 13.

Railroad Conventions.

The *Western Association of General Passenger and Ticket Agents* will hold its next regular meeting at the Southern Hotel, St. Louis, beginning Wednesday, Feb. 14, at 11 a. m. The annual election of officers will take place at this meeting.

The *General Baggage Agents' Association* will hold its annual convention at the Grand Central Hotel, New York, beginning on Wednesday, Feb. 21. Agents have been requested to compile for this meeting statements of unclaimed baggage and results of weighing baggage; also list of special checks issued to points to which there are in use regular or joint reversible baggage checks by route named on the special check.

The *National Association of General Passenger and Ticket Agents* will hold its next meeting in Jacksonville, Fla., March 20.

The *General Time Convention* will hold its spring meeting at the Lindell House in St. Louis, April 11.

The *Southern Time Convention* will meet at the National Railway Club Rooms, No. 46 Bond street, New York, April 18.

Technical Meetings and Conventions.

The *Master Car-Builders' Club* will hold its next meeting at the rooms, No. 113 Liberty street, New York, on Thursday evening, Feb. 15, at 8 o'clock. Subjects for discussion: The Heating and Lighting of Passenger Cars, and the Construction of Car Seats.

The *American Institute of Mining Engineers* will hold its annual meeting in Boston, beginning on Tuesday, Feb. 20.

The *Master Mechanics' Association* will hold its annual convention in Chicago, June 19 next.

Dividends.

Dividends have been declared as follows:

Chicago & Alton, 4 per cent., semi-annual, payable March 1. Transfer books close Feb. 14.

Chicago & West Michigan, 3 per cent. for the year 1882, payable Feb. 15. Transfer books close Feb. 6.

Cleveland & Pittsburgh (leased to Pennsylvania Company), 1 $\frac{1}{2}$ per cent., quarterly, payable March 1. Transfer books close Feb. 10.

Detroit, Lansing & Northern, 3 $\frac{1}{2}$ per cent., semi-annual, on preferred stock, and 3 per cent. on common stock, payable Feb. 15. Transfer books close Feb. 3.

Kansas City, Fort Scott & Gulf, 4 per cent. on preferred stock and 3 per cent. on common stock, payable Feb. 15. Transfer books close Feb. 6.

Foreclosure Sales.

The *Cleveland, Tuscarawas Valley & Wheeling* road was sold under foreclosure of mortgage in Cleveland, O., Feb. 5, and bought for \$3,252,500 by Mr. Perkins as trustee for the bondholders. The purchase money will be paid chiefly in bonds of the foreclosed mortgages. The road extends from Lorain, O., to Bridgeport, 158 miles, and was sold subject to the preferred mortgage for \$700,000, and some small mortgages on real estate. The bonded debt included under the foreclosure amounted to \$3,552,000.

The *Texas Trunk* road will be sold in Dallas, Tex., May 7, under a decree of the United States Circuit Court, to satisfy a mortgage given to the International Trust Co., of Boston. The amount due is stated at \$228,814. The road extends from Dallas, Tex., to Kaufman, 35 miles.

American Institute of Mining Engineers.

Prof. Thomas M. Drown, of Easton, Pa., Secretary of the Institute, has issued the following programme for the annual meeting in Boston:

Tuesday, Feb. 20.—Opening session at 8 o'clock p. m., at the Brunswick Hotel. Address of welcome by Mr. Edward Atkinson, and by Mr. Thomas Doane on behalf of the Boston Society of Civil Engineers. Reading and discussion of papers.

Wednesday, Feb. 21.—Session at 9 a. m. at the Massachusetts Institute of Technology. Excursions from 12 to 5 o'clock, visiting the Leavitt pumping engine, the Carson Sewer excavating apparatus, and the Norway Iron Works. Evening session at 8 o'clock at the Institute of Technology.

Thursday, Feb. 22.—Excursion by omnibus at 8:30 and 9:30 a. m., to the Watertown Arsenal, to inspect the United States testing machine. At 11:30 to Harvard University. Lunch will be served at 2 p. m. in Alumni Hall. Session at 3 p. m., in Room 11, Seaver Hall. Return to Boston at 5 o'clock. Subscription dinner at 8 o'clock at the Brunswick Hotel.

Friday, Feb. 23.—Final session at 9 a. m., at the Institute of Technology.

Mr. James B. Francis will make arrangements to conduct an excursion to Lowell, to visit the extensive water works, and one of the cotton-mills.

Members are invited to stop over at Worcester, on their way home, to visit the Worcester Free Institute, and also some of the manufacturers of the city.

The Hotel Brunswick, opposite the Institute of Technology, will be the headquarters of the Institute during the meeting. The usual charge of \$5 a day will be reduced to \$4 a day,

if 40 or more members stop there. The Hotel Vendome, also near the Institute of Technology, charges \$5 a day.

Negotiations for reduced railroad rates to Boston are not yet completed. Members will please give prompt notice to the Secretary of the Institute of their intention to be present at the meeting (and also if ladies will accompany them) and they will then be promptly informed of any railroad arrangements which may have been made.

The following papers have been announced:

Gas Producer Explosions. By P. Barnes, Elgin, Ill.

Microscopic Analysis of the Structure of Iron and Steel. By J. C. Bayles, New York City.

Metalurgy of Nickel in the United States. By W. P. Blake, New Haven, Conn.

The Mining Regions About Prescott, Arizona. By John F. Blandy, Prescott.

The Collection of Flue-Dust at Ems. By T. Egleston, New York City.

The Eocene and Lower Paleozoic in South Wales, and their Comparison with their Appalachian Analogues. By D. Persifer Frazer, Philadelphia.

No 1 on the Geology of Egypt, with especial reference to the rocks from which the obelisks have been taken. By Dr. Persifer Frazer.

Notes on a Protected Iron Hot-blast Stove. By Frank Firmstone, Easton, Pa.

The Shop Treatment of Structural Steels. By A. F. Hill, New York City.

A Suggestive Cure for Blast-Furnace Chills. By H. M. Howe, Boston.

Coal and Iron of Alabama. By T. Sterry Hunt, Montreal.

Lines of Weakness in Cylinders. By R. H. Richards, Boston.

The Strength of American Woods. By S. P. Sharples, Newark, N. J.

Determination of Manganese in Spiegel. By G. C. Stone, Newark, N. J.

History and Statistics of the Manufacture of Coke. By J. D. Weeks, Pittsburgh, Pa.

Notes on Setting Tanks in Silver Mills. By Albert Williams, Jr., Washington.

Gen. Francis A. Walker is President and Prof. R. H. Richards Secretary of the local committee of arrangements.

ELECTIONS AND APPOINTMENTS.

Belvidere Delaware.—At the annual meeting in Trenton, N. J., Feb. 5th, the following directors were chosen: Charles Bartles, G. Morris Dorrance, Hugh B. Ely, H. H. Houston, Strickland Kneass, Lewis Perine, Edmund Smith, Henry D. Welch, J. Price Wetherill. The board elected Strickland Kneass, President; Hugh B. Ely, Secretary and Treasurer. The road is leased to the Pennsylvania Railroad Co.

Boston, Barre & Gardner.—At the annual meeting, Feb. 7, the following directors were chosen: N. D. White, Wm. W. Hendon, Mass.; Franklin Eaton, Gardner, Mass.; A. G. Bullock, Calvin Foster, Samuel R. Heywood, Samuel E. Hildreth, Wm. H. Morse, W. W. Rice, Stephen Salisbury, Jr., E. W. Vail, H. M. Witter, Worcester, Mass. The board elected H. M. Witter President; Wm. E. Starr, Clerk and Treasurer.

Boston, Hoosac Tunnel & Western.—Mr. Charles H. Cory is appointed Superintendent of this road, vice J. L. Butman, resigned, taking effect Feb. 10.

Bridgeton & Saco River.—Mr. George Mansfield has been appointed Superintendent and Mr. F. F. Foss Master of Transportation.

Brunswick & Western.—The officers are: President, Frederick Wolfe; Vice-President and Consulting Engineer, Charles L. Schlatter; Secretary and Treasurer, Abram E. Bamberg; Superintendent, R. D. Meader; Auditor and General Freight and Passenger Agent, W. T. Jones. Offices in Brunswick, Ga., except that of the President, which is in New York.

Central, of Georgia.—Mr. S. M. Inman, of Atlanta, Ga., has been chosen a director in place of E. C. Anderson, deceased.

Chicago & Atlantic.—Mr. S. W. Snow has been appointed General Passenger Agent, with office in Chicago. He has been for some time past General Western Agent of the New York, Lake Erie & Western road.

Chicago & Northwestern.—Mr. Horace C. Burt is appointed Superintendent of the Iowa Division in place of Mr. John M. Whitman, who has gone to the Chicago, St. Paul, Minneapolis & Omaha road. Mr. Marcellus Hopkins (late Assistant Superintendent of the Galena Division) succeeds Mr. Burt as Superintendent of the Northern Iowa Division. Mr. Otto Miller succeeds Mr. Hopkins on the Galena Division.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. John M. Whitman has been appointed General Superintendent in place of Charles F. Hatch, resigned. Mr. Whitman was formerly Receiver of the Chicago & Pacific road, and for some time past has been Superintendent of the Iowa Division of the Chicago & Northwestern.

Cincinnati, Van Wert & Michigan.—The new board has elected officers as follows: President, Grinnell Burt, New York; Vice-President, J. M. C. Marble, Van Wert, O.; Secretary and Treasurer, D. B. Halstead, New York; Assistant Secretary and Treasurer, W. H. Pennell, Van Wert, O.; Superintendent, E. C. Davis, Cincinnati.

Cincinnati, Washington & Baltimore.—This company has been organized, as successor to the Marietta & Cincinnati, with the following directors: George Hoadley, J. L. Kleeck, James D. Lehmer, Cincinnati; W. T. McClintick, Chillicothe, O.; Orland Smith, Columbus, O.; Robert Garrett, T. Edward Hambleton, Samuel Spencer, J. Carroll Walsh, Baltimore.

Huntington & Broad Top Mountain.—At the annual meeting in Philadelphia, Feb. 6, the following were chosen: President, B. Andrews Knight; Directors, Wm. J. Barr, John Dureux, Spencer M. Janney, Wm. P. Jenks, James Long, Jacob Naylor, Thomas R. Patton, Joseph H. Trotter, C. V. Wharton, James Whittaker, I. V. Williamson, Rathmell Wilson.

Lowell & Framingham.—At the annual meeting last week the following directors were chosen: S. N. Aldrich, H. A. Blood, Wm. O. Brown, John H. Buttrick, Charles F. Choate, James W. Clark, Frank A. Day, John Fletcher, D. E. Harding, Jacob Nichols, S. B. Rogers, Nathaniel Thayer, Jr., Daniel Wetherbee. The road is leased to the Old Colony.

Manufacturers' Belt.—The directors of this new company are: Josephus Collett, Paul C. Davis, C. Fairbanks, R. G. Harvey, R. G. Jenkes, A. O. Johns, I. B. Johns. Office in Terre Haute, Ind.

New York & Boston Inland.—At a meeting held in Boston, F. H. 4, the following directors were chosen: J. R. Bodwell, Hallowell, Me.; George Cook, New Haven, Conn.; Charles T. Sabin, Montpelier, Vt.; H. A. Blood, Charles Burleigh, Fitchburg, Mass.; John H. Buttrick, Lowell, Mass.; Samuel L. Ham, Peabody, Mass.; Wm. F. Draper,

Hopedale, Mass.; George W. Johnson, H. E. Morgan, Milford, Mass.; Wm. Rotch, New Bedford, Mass.; Moody Merrill, Moses Webster, Boston.

Oregon Railway & Navigation Co.—Mr. Robert E. O'Brien has been appointed Assistant Manager, in place of J. M. Buckley, who has gone to the Northern Pacific. Mr. H. S. Rowe has been appointed Superintendent of the Railroad Division. Offices in Portland, Oregon.

Providence & Worcester.—At the annual meeting, Feb. 5, the following directors were chosen: Elijah B. Stoddard, Joseph E. Davis, Jonas G. Clark, Worcester, Mass.; Charles E. Whiting, Josias Lasell, Whitingville, Mass.; Estus Lamb, Blackstone, Mass.; David K. Phillips, Boston, Mass.; Gideon L. Spencer, Pawtucket, R. I.; Lyman A. Cook, Oscar J. Rathbun, Woonsocket, R. I.; George A. Leete, Moses B. I. Goddard, Amos D. Lockwood, Frederick Grinnell, Benjamin F. Thurston, Providence, R. I. Messrs. Clark, Thurston and Whiting are new directors, succeeding John Dean, Wm. S. Slater and Paul Whiting.

Rochester & Pittsburgh.—The work of construction on the Buffalo Division will hereafter be under the charge of R. P. Van Densen, Division Engineer, subject to the supervision of Mr. J. A. Latcha, Consulting Engineer.

St. Paul, Minneapolis & Manitoba.—The following circular is dated St. Paul, Minn., Feb. 1: "Mr. Stillman E. Dana is hereby appointed General Baggage Agent. His orders will be respected by train and station baggagemen."

Scioto Valley.—Mr. Isaac E. Gates has been chosen Secretary, in place of J. P. Curry, resigned.

Southwestern Pool Arbitrator.—Mr. George M. Bogue, of Chicago, now a member of the Illinois Road Commission, has accepted the office of Arbitrator for the Southwestern Railway Association, the Colorado Traffic Association and the Iowa Trunk Lines Association.

Texas Trunk.—Mr. C. A. Keating has been appointed Receiver of the United States Circuit Court.

Utica, Ithaca & Elmira.—Mr. A. A. McLeod has been appointed General Manager. Mr. C. R. Fitch is appointed Superintendent in place of J. L. Greasinger, resigned.

York & Peachbottom.—The officers of this company are: President, Charles R. McConkey; Secretary, E. C. Bender; Treasurer, E. G. Smyser; Superintendent and General Freight Agent, S. M. Manafort; General Passenger Agent, F. G. Metzger. Offices in York, Pa.

Youghiogheny & Elizabeth.—Mr. C. B. Johnson, of Meadville, Pa., is President of this new company.

PERSONAL.

—Mr. Cary A. Wilson has resigned his position as Engineer in charge of the construction of the Buffalo Division, and will go to a western road.

—Mr. J. T. Moody, who recently resigned his position as Superintendent of the New York Division of the New York, New Haven & Hartford road, has been presented with a very handsome gold-headed ebony cane by the locomotive engineers of the division.

—Mr. Charles F. Hatch has resigned his position as General Superintendent of the Chicago, St. Paul, Minneapolis & Omaha road, and will, it is said, go to a road further east. Mr. Hatch was formerly General Superintendent of the Lake Shore & Michigan Southern, and later General Manager of the Eastern Railroad.

—Mr. Samuel Harlan, Jr., President of the Harlan & Hollingsworth Co., of Wilmington, Del., died in Vienna, Feb. 6, aged 76 years. Mr. Harlan has been engaged in building ships and railroad cars for many years, and leaves a large fortune, chiefly invested in the business. He has not taken an active part in business, however, since 1880, when he started on the European tour just closed by death. The Harlan & Hollingsworth Co. was founded in 1836, under the firm name of Betts, Pusey & Harlan. In 1841 Mr. Pusey retired, and Mr. Elijah Hollingsworth entered the firm, the name becoming Betts, Harlan & Hollingsworth. In 1849 Mr. Betts withdrew, and the firm became Harlan & Hollingsworth. In 1858 Mr. J. Taylor Gause became a partner, and the style of the firm was changed to Harlan, Hollingsworth & Co. In 1866 Mr. Hollingsworth died, and in 1867 a corporation was formed with Mr. Harlan as President and Mr. Gause as Vice-President.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

| Month of January | 1887 | 1888 | Inc. or Dec. | P. c. |
|-----------------------------|-------------|-------------|--------------|-------|
| Chicago & E. St. Illinois | \$8,000,000 | \$8,000,000 | I. \$51,004 | 8.8 |
| Chi., Milwaukee & St. Paul | 1,694,914 | 1,644,654 | D. 55,260 | 3.3 |
| Chicago & North Western | 13,600,000 | 14,434,536 | D. 75,536 | 5.3 |
| Chi., St. P., Minn. & Omaha | 2,827,702 | 1,644,918 | D. 20,216 | 15.9 |
| Columbus, H. V. & Toledo | 9,284,000 | 9,273,335 | D. 21,385 | 7.5 |
| Denver & Rio Grande | 222,140 | 220,930 | L. 1,476 | 0.7 |
| East Tenn. & Ga. | 5,830 | 48,990 | D. 70,293 | 12.3 |
| Hannibal & St. Louis | 179,544 | 180,514 | L. 1,963 | 4.5 |
| Ind., Bloom. & Western | 247,422 | 195,823 | L. 51,719 | 26.4 |
| Long Island | 121,593 | 121,593 | L. 7,663 | 6.3 |
| Louisville & Nashville | 115,600 | 964,524 | L. 150,476 | 15.6 |
| Missouri Pacific Lines | | | | |
| Central Branch | 11,621 | 65,074 | L. 46,457 | 71.6 |
| International & Gt. N. W. | 742,738 | 2,012,124 | L. 106,614 | 45.3 |
| Missouri, K. & T. | 5,419 | 5,419 | L. 153,783 | 30.0 |
| Missouri Pacific | 792,510 | 452,050 | L. 179,593 | 37.1 |
| St. L. Iron Mt. & So. | 554,527 | 261,000 | L. 170,588 | 56.4 |
| Texas & Pacific | 584,527 | 3,202,007 | L. 210,629 | 65.0 |
| Mobile & Ohio | 28,267 | 213,841 | L. 41,425 | 74.7 |
| Northern Pacific | 302,360 | 245,565 | L. 146,068 | 59.9 |
| Other roads | 47,053 | 82,000 | L. 5,093 | 15.6 |
| St. L. & San Francisco | 280,303 | 29,791 | L. 31,162 | 12.3 |
| Union Pacific | 1,739,000 | 1,063,000 | D. 20,000 | 13.3 |
| Wabash, St. L. & Pacific | 13,7783 | 12,9963 | L. 77,818 | 6.3 |
| Four weeks to January 27: | | | | |
| Chicago & Grand Trunk | 180,844 | 115,549 | L. 74,295 | 64.0 |
| Grand Trunk | 1,253,942 | 1,000,984 | I. 164,958 | 15.1 |
| Year ending December 31: | 1882 | 1881 | | |
| Midland North Carolina | 153,823 | ..... | ..... |  |
| Net earnings | 44,303 | ..... | ..... |  |
| Month of December: | | | | |
| Central, of Georgia | 410,173 | 462,627 | D. 52,455 | 11.3 |
| Net earnings | 197,423 | 192,518 | L. 4,065 | 2.4 |
| Connotton Valley | 20,612 | ..... | ..... |  |
| Danbury & Norwicht | 12,724 | 15,100 | D. 2,466 | 16.4 |
| Denver & R. G. Western | 31,900 | ..... | ..... |  |

Grain Movement.

For the week ending Jan. 27 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past seven years:

| Year | Northwestern | Northwestern | Atlantic |
|------|--------------|--------------|-----------|
| 1877 | 1,721,443 | 839,521 | 1,546,128 |
| 1878 | 3,013,465 | 2,272,058 | 2,662,375 |
| 1879 | 3,500,156 | 1,350,918 | 1,778,971 |
| 1880 | 3,452,141 | 1,571,994 | 3,691,855 |
| 1881 | 3,287,602 | 1,066,530 | 2,053,554 |
| 1882 | 3,287,541 | 3,166,282 | 1,905,946 |
| 1883 | 3,245,005 | 1,875,475 | 2,726,600 |

The receipts of the Northwestern markets for the week were thus smaller than in any corresponding week since 1877, and 382,052,000 bushels (88 per cent.), less than last

last year, when, however, they were the largest ever known in a winter week. They were greatly reduced this year by the severe weather and snow blockades, which prevented farmers bringing grain to the stations and trains from getting through with it to the markets, and this condition of things will be felt for at least two weeks more. The receipts of the week were also 440,000 bushels less than the previous week of this year and were the smallest since the middle of July. The average weekly receipts of these markets were 5,234,854 bushels in November, 5,234,700 in December, and 3,822,000 in January.

The shipments of these markets were 1,281,000 bushels (40 per cent.) less than in the corresponding week of last year and less than in 1878, but larger than in any other year or in any week when rates were maintained. They were 996,000 bushels less than the previous week of this year and the smallest since last May, though there were many weeks when navigation was open that the rail shipments were smaller. Of the total 89,000, or 4.8 per cent., went down the Mississippi, the first reported for three weeks.

The receipts of Atlantic ports for the week were larger than in any corresponding week except in 1880, and 820,000 bushels more than last year. They were also 224,000 bushels more than the previous week of this year.

The falling off in Northwestern receipts of late weeks has been almost wholly at Chicago and Milwaukee. The receipts at St. Louis in the week ending Jan. 27 were larger than in any other week of the month. This is an indication that the severe weather and snow blockades have had much to do with the falling off in receipts.

The exports of the Atlantic ports for this week were 2,338,814 bushels of grain and 303,028 barrels of flour. Of the grain, 32.2 per cent. went from Baltimore, 30.3 from New York, 15.9 from Philadelphia, 9.4 from Boston, 7.7 from New Orleans, and 4.5 per cent. from Portland. Of the flour 68.7 per cent. went from New York, and 16.3 from Boston.

For the week ending Jan. 31, the exports have been for three years:

| | 1881. | 1882. | 1883. |
|-------------|-----------|---------|-----------|
| Flour, bbls | 133,920 | 70,467 | 289,465 |
| Grain, bu. | 2,029,028 | 835,440 | 2,670,476 |

Including flour the exports of the week were 2.45 per cent. more this year than last year, and 54 per cent. more than in 1881 even.

For the week ending Feb. 3, receipts at Chicago and Milwaukee and shipments at Milwaukee only (Chicago not reporting) have been:

| | Receipts. | Shipments. |
|-------------|---------------|---------------|
| Flour, bbls | 1881. 189,249 | 1882. 170,379 |
| Grain, bu. | 2,969,005 | 2,776,999 |
| | 197,866 | 139,450 |

The receipts this year were somewhat larger than last year when they were very large; the Milwaukee grain shipments are so small a part of the whole that not much may be judged from them; but the shipments were unusually large last year and probably were less this year.

For the week ending Feb. 3, receipts at four Eastern ports have been:

| | Bushels. | New York. | Boston. | Phila. | Baltimore. | Total. |
|-------|-----------|-----------|---------|---------|------------|--------|
| 1883. | 1,014,260 | 336,375 | 344,850 | 976,137 | 2,671,622 | |
| 1882. | 984,159 | 735,905 | 279,300 | 116,442 | 2,115,806 | |
| 1881. | 612,142 | 266,429 | 312,200 | 514,703 | 1,705,476 | |

P. c. of total:

| | 1883. | 12.6 | 12.9 | 36.5 | 100.0 |
|-------|-------|------|------|------|-------|
| 1882. | 46.5 | 34.8 | 13.2 | 5.5 | 100.0 |
| 1881. | 35.0 | 15.6 | 18.3 | 30.2 | 100.0 |

Thus Philadelphia and Baltimore together received 39.4 per cent. of the whole this year, against 18.7 last year and 48.5 in 1881. The change at Baltimore since last year is particularly noticeable, and is due to the much larger surplus for export this year, as that place receives little except for export. The decrease at Boston is also very great, but its receipts were extraordinary last year.

Coal.

Coal tonnages for the week ending Jan. 27 are as follows:

| | 1883. | 1882. | Inc. or Dec. | P. c. |
|--------------------|---------|---------|--------------|-------|
| Anthracite | 388,556 | 321,814 | L. 76,742 | 23.8 |
| Semi-bituminous | 87,405 | 93,333 | D. 5,928 | 6.4 |
| Bituminous, Penna. | 68,201 | 69,737 | D. 1,536 | 2.2 |
| Coke, Penna. | 65,767 | ..... | ..... |  |

The anthracite market remains dull and quiet, with prices said to be very much below the company's lists. It is thought that the half-time system of working will be continued for several weeks yet.

The Grand Trunk Railway Co. will receive at the office of Joseph Hickson, General Manager, in Montreal, until Feb. 18, bids for supplying 122,000 tons of coal during the season of 1883. Of the whole supply 70,000 tons are to be delivered at Montreal, 17,000 tons at Chaudiere, P. Q., and 35,000 tons at Portland, Me. If coal delivered at Montreal is brought by water the bids made must include cartage.

The coal tonnage of the Chesapeake & Ohio Railroad for the year ending Dec. 31 was:

| | 1882. | 1881. | Increase. | P. c. |
|------|---------|---------|-----------|-------|
| Coal | 558,981 | 696,050 | 162,931 | 23.4 |
| Coke | 91,819 | 77,376 | 14,543 | 18.9 |

Total. 950,900 773,426 177,474 22.9

Of the total tonnage in 1882 there was carried to Richmon and Newport News 420,731 tons; delivered on line of road (including coal to other roads), 226,398; shipped west of Huntington by rail and river, 104,154; for company's use, 189,617; total, 950,900 tons.

The coal tonnage of the Pennsylvania Railroad for the week ending Jan. 27, was: Coal, 157,543; coke, 61,647; total, 219,490 tons. Of this 123,373 tons of coal and 46,707 tons of coke were mined on the line, while 34,471 tons of coal and 14,940 tons of coke were received from other roads. The total tonnage this year to Jan.

and connect with the New York, Pittsburgh & Chicago a short distance north of the river. There has been difficulty in regard to right of way, some farmers opposing so vehemently as to have working gangs arrested. A large gang was summoned before a local justice a few days ago for trespassing at Armour's Summit and Harbison's Crossing, but were discharged upon bond of \$4,000 being given."

Baltimore & Potomac.—This company expects to have completed by May the entire double track from Baltimore to Washington. The construction of the double track was begun in 1880, and since that time various parts of the second track have been laid. The extension of the bridges over the Patapsco, Roche's Harbor and the Big Patuxent are nearly finished. The construction work has all been done in a thorough manner. All the bridges in this line excepting the one at Gwynn's Falls are constructed of stone and iron, and that will be replaced during this year with a more substantial one.

Belt Railway Co. of Chicago.—This is the name adopted by the company formerly known as the Western Indiana Belt Co. Since the change of ownership in the Chicago & Western Indiana road, it has been decided to reorganize the belt line as a separate corporation. This was done in Chicago last week, when it was decided to allow all the companies whose lines enter the city to become subscribers, provided they desire to do so.

Boston & Albany.—This company has bought a tract of land adjoining its yard in Springfield, Mass., from Chester W. Chapin for \$25,000.

A bill has been somewhat hurriedly put on its passage through the Massachusetts Legislature, which provides that "no bond or note heretofore issued by any railway company for any lawful purpose shall be invalid by reason of not having been approved and certified by some person appointed by the corporation for that purpose," and also provides that in case of informality such bonds or notes may be validated by vote of the corporation at any regular or special meeting within 90 days of the passage of this act. It is understood that the special object of the bill is to cover the case of this company's bonds issued to pay for the state stock, those bonds having been issued without the appointment of a person to approve and certify them as required by law. There is no question as to the legality of the issue in any respect except in the failure to comply with this formality.

Brattleboro & Bennington.—Nearly all the towns on the line of this projected road have now voted aid to the road, and it will very probably be built.

Buffalo, New York & Philadelphia.—The stockholders of this company met Feb. 5 and voted to approve the agreement of consolidation with the Buffalo, Pittsburgh & Western Co., as made a short time since. The stockholders of the controlled Olean & Salamanca Co. met at the same and also approved the agreement.

Buffalo, Pittsburgh & Western.—The stockholders of this company met in Philadelphia, Feb. 5, to vote on the agreement of consolidation with the Buffalo, New York & Philadelphia, the Olean & Salamanca and the Oil City & Chicago lines. No action was taken, on account of the non-arrival of the steamer having the proxies for the stock held in Holland, and the meeting adjourned until Feb. 8, when it was expected that the agreement would be ratified.

Camden & Atlantic.—The Chancellor of New Jersey has made perpetual the injunction restraining the directors of this company from changing the date of the annual meeting from Feb. 22 until some time in the fall. It is well understood that a majority of the stock is now held in the interest of the Pennsylvania Railroad Co., and the object of the present board in changing the date of the meeting was to postpone the change of management as long as possible.

Carolina Central.—The Legislature of North Carolina has passed a resolution directing the Attorney-General of the state to begin suit to forfeit the stock of this company now owned by the Seaboard & Roanoke Co., on the ground that that company had no legal right to buy or hold the stock under its charter or under the general laws of the state.

Chicago, Burlington & Quincy.—It is reported from Chicago that this company has concluded a traffic agreement with the Denver & Rio Grande, one of the conditions of which is that the Rio Grande road is to carry the Burlington's traffic through to Salt Lake and Ogden, as soon as its line is completed. This appears to be doubtful.

Columbus, Chicago & Indiana Central.—The United States Circuit Court has confirmed the sale of this road under foreclosure to Wm. L. Scott, C. J. Osborn and John S. Kennedy, as representatives of the bondholders. The necessary cash payments have been made and bonds turned over for the balance of the purchase-money. Arrangements have been nearly completed for the organization of the new company.

Delaware Western.—This company has approved the proposed issue of 71,000 shares of new stock, and also an agreement of consolidation with a new company just formed in Pennsylvania.

The company has asked the Delaware Legislature for authority to change the location of its proposed extension, which is to form part of the Baltimore & Ohio's line to Philadelphia; also for an extension of time fixed for completion of the road to Jan. 1, 1885.

East Tennessee, Virginia & Georgia.—The Ohio Division is now completed to the Kentucky state line, 27 miles northward from the old terminus at Careytown, and 65 miles from Knoxville, Tenn. The new line has not yet been opened for traffic, and possibly will not be fully opened until it is met at the state line by the extension of the Louisville & Nashville's Knoxville Branch. The stations on the new line, with the distances from Careytown, are: Buckeye, S. 62; Stanfill Tunk, 13 08; Elk Valley, 18 73; Newcomb, 23 51; McShea City, 26 95 miles. There are several tunnels and much heavy work on this extension.

Elizabeth City & Norfolk.—By acts of the legislatures of North Carolina and Virginia the name of the Elizabeth City & Norfolk Railroad Co. has been changed to that of the Norfolk Southern Railroad Co. From and after this Feb. 1 all transactions of the company will be made under the new name.

Galveston, Harrisburg & San Antonio.—The length of this road from San Antonio, Tex., to El Paso, as now completed, is 623 miles. The total length of the main line, from Houston to El Paso is 839 miles. The distance from Houston to San Francisco by this road and the Southern Pacific is 2,127 miles, and from Galveston to San Francisco, 2,177 miles.

Galveston, Sabine & St. Louis.—This company has been organized to build a railroad from Galveston, Tex., to a suitable point on Red River, in Grayson County; also a line from a point in Shelby County, on the main line, to and through Harrison County to the state line. The office is in Longview, Tex.

Grand Trunk.—A report comes from London that proceedings are to be taken in the Canadian courts to test the legality of the consolidation of the Grand Trunk and the Great Western companies.

It is reported that officers of this company have been inspecting the Portsmouth (N. H.) navy yard, with a view to the purchase of this property should the government decide to sell it.

Hartford & Harlem.—This newly organized company has applied to the Connecticut Legislature for authority to consolidate with any corporation in New York and to issue bonds on the consolidated line in both states.

The location of the road is now before the Railroad Commission. Its approval is opposed by the New York & Connecticut Air Line Co., a corporation which has never done any work, but has made and filed a location very close to that of the Hartford & Harlem, the two crossing a number of times.

Illinois Central.—This company announces the completion of arrangements for the sale of through tickets from Chicago to San Francisco. The route will be over its line New Orleans, and thence to San Francisco over the Southern Pacific. The rates will be the same as by other lines. The route is 500 miles longer than by the Central and Union Pacific, but the managers believe that the greater comfort of winter travel by the Southern route would induce many to go that way.

Jamesville & Washington.—This road is now leased and worked by the Elizabeth City and Norfolk Co. The road extends from Jamesville, N. C., on the Roanoke River, southward to Washington, at the junction of Tar River with the Pamlico, a distance of 22 miles. The connection between the two roads is at present by steamboat between Edenton and Jamesville, but it is intended to make a rail connection, and probably to use the leased road as part of the proposed extension to Newberne and Wilmington.

Kansas & Gulf Short Line.—The grading is nearly completed on the extension of this road from Jacksonville, Tex., north to Tyler, and tracklaying will soon be begun.

Lamoille Valley Extension.—This company is the organization which is to build the connecting link between the Ogdensburg & Lake Champlain road at Rouses Point, N. Y., and the St. Johnsbury & Lake Champlain at Swanton, Vt. The road, when completed, will probably be held by both companies under a joint lease. The line is not very long, but it includes an expensive bridge over the northern end of Lake Champlain.

Louisville, New Albany & Chicago.—This company has made final and complete settlement with the Crawford Syndicate, which built the Chicago & Indianapolis Air Line, now consolidated with this road. Complete possession of the road will be transferred at once. This company has been operating the Northern end of the line for some time. No date has yet been announced for the opening of the line to Indianapolis.

Manhattan.—The New York Supreme Court, General Term, has set aside the injunctions issued by a single judge of the Court to restrain stockholders of the Metropolitan Elevated Co. from bringing suits to enforce the lease or agreement, or on account of the agreement of Oct. 22, 1881, under which suits those stockholders who have not assented to the modified lease claim 10 per cent. dividends from the Manhattan Co. The Court also sets aside the injunction restraining the Metropolitan Elevated Co. from issuing stock certificates endorsed with the memorandum of the original lease.

Manufacturers' Belt.—This company has been incorporated to build a belt or connecting line around the city of Terre Haute, Ind., to connect the lines entering that city, and also to give convenient access to the large factories. The line will be about 4 miles long.

Marietta & Cincinnati.—The bondholders, who bought this road at the foreclosure sale, met in Chillicothe, O., Feb. 7, and organized the Cincinnati, Washington & Baltimore Railroad Co. The board does not much differ from that of the old company.

Mexican National.—The Mexican Financier of recent date says: "Mr. James Sullivan, as representative of the Mexican National Construction Co., has signed a contract with the government whereby all the railroad concessions belonging to the company are consolidated. Some of the modifications are important and most advantageous to the company. In case of failure to complete any of the lines within the time stipulated the company is obligated to pay to the Federal treasury, for each kilometre unfinished, a fine of \$1,000, said fine to be paid by the net yield of the parts of the roads in operation. This important modification will prevent the confiscation of the road in case of failure to fulfill the letter of the contract. The company has the right to increase its tariff rates, and the subvention, which is made uniform at \$11,270 a mile, will be paid by 6 per cent. of the customs receipts, instead of 4 per cent. as heretofore. The time to finish the entire system of road is extended to 10 years from the date of the new contract."

A later number of the same paper says: "The increase in freight tariffs secured by the Mexican National Railroad by the new concession of January 10, 1883, is as follows: The rates formerly fixed were 6.50, 4.90 and 3.25 cents per ton per mile on first, second and third class freights respectively. The new rates are 8 1/2 cents per ton per mile on first-class, 5.80 cents on second-class, and 4.125 cents on third class freights."

"The increase in passenger rates granted by the new concession to the Mexican National affects only third-class passengers. The first and second class remain at 4.06 cents and 3.25 cents per mile respectively. Third-class fares are increased from 1 cent per kilometre (equalling 1.6 cents per mile) to 1.5 cents per kilometre, or 2.4 cents per mile. As the great majority of those traveling on Mexican railways belong to the laboring ranks, and demand only third-class tickets, the increase in this class of rates will prove very remunerative to the company."

Mexican Railroad Notes.—The following notes are from the Mexican Financier of recent date:

An official summary made by the government shows that 2,305 miles of railroad were constructed in Mexico up to Dec. 31 last. The more prominent of these roads have in operation:

| | |
|--------------------------|------------|
| Mexican Railroad | 356 miles. |
| Mexican National | 432 " |
| Mexican Central | 596 " |
| Sonora Railroad | 313 " |
| Interoceanic Railroad | 186 " |
| Yucatan Railroad (total) | 60 " |
| Tehuantepec Railroad | 16 " |

A meeting of the board of directors of the Matamoros-Izcar Railroad has been called for Jan. 15, to appoint a commission to investigate the financial condition of the road.

The railroad building from Vera Cruz south along the coast to Alvarado is completed for 25 miles.

An engineering party under the direction of Mr. Wm. S.

Thomson has gone to Tuxpan, to survey the railroad from that point. The work will present but little difficulty except for about 50 miles crossing the Cordilleras. It will cross the Irolo road near Tepic, connecting with the Mexican National Railroad at a point about 23 miles from this city (Mexico), which it will reach by the National rails. This will place the seaboard at Tuxpan some 40 miles closer to this city than Vera Cruz now is, and as the river is navigable for large vessels for a distance of about 18 miles from the Gulf, the Tuxpan & Mexican Railroad Co. expects to have excellent harbor facilities. The company holds a concession for a road to this city, and when this will be constructed it will effect a further saving of 10 miles on its temporary connection with the National road. The necessary means for building the road from Tuxpan to Tepic are said to be in hand and the work will be pushed energetically.

It is definitely announced that all work on the Gould railway concession from Laredo south has been permanently suspended.

The manager of the Tehuantepec Isthmus Railroad has notified the government that by the end of this month a force of 4,000 men will be employed on the work of construction.

The great mining city of Pachuca and the Real del Monte are now in direct connection with the city of Mexico by rail, via the Mexican Railway to Irolo, and thence by the Irolo road to Pachuca. Convenient time tables have not yet been arranged, and the cars are run between Irolo and Pachuca by animal power. During this week two new Baldwin engines have been received from Philadelphia and will be placed on the road as soon as the contractors will have completed a few small stone bridges, to replace the present wooden structures. This will be done in a few days.

New Castle & Northern.—This company has been organized to build a railroad from a point in Lawrence County, Pa., northward through New Castle to Sharpsville, about 25 miles. It is apparently intended to be a branch of the Pittsburgh & Western.

New York & New England.—Sealed proposals will be received at the office of L. B. Bidwell, Chief Engineer, in Boston, until Feb. 15, for the grading and masonry for the second track from Blackstone, Mass., of the Eastern switch at Andover, Conn., a distance of 38.3 miles.

Sealed proposals will be received at the Treasurer's office in Boston until noon of Feb. 20 for all or any part of \$1,258,000 of the new 6 per cent. second-mortgage bonds of the company. The proceeds are to be used to pay for the new second track and other improvements.

New York, New Haven & Hartford.—A few parcels of the land required for the new tracks between New Rochelle and Stamford will have to be condemned, the owners not being willing to agree to the terms offered by the company. The location has still to be finally approved by the Connecticut Railroad Commission. It is thought, however, that contracts for most of the work will be let in a few days.

Ohio & Mississippi.—The Receiver gives notice that he will pay, at the New York office of the company, Feb. 12, the coupons on the second-consolidated mortgage bonds which fell due Oct. 1, 1877. No interest will be paid, the question of interest on overdue coupons being reserved for future decision by the Court, but the names of those to whom payment is made will be taken and reported to the Court, in order that they may receive the interest, should it be allowed hereafter.

Paris, Georgetown & Frankfort.—This company has filed a mortgage on its projected line from Frankfort, Ky., to the Virginia line, to secure an issue of \$5,000,000 bonds to be made. The company owns no finished road.

Pennsylvania.—The earnings of the Philadelphia & Erie Division for the year ending Dec. 31 are reported as follows:

| | 1882. | 1881. | Inc. or Dec. | P. c. |
|----------------------|-------------|-------------|--------------|-------|
| Earnings | \$4,011,413 | \$3,422,038 | I. \$589,375 | 17.2 |
| Expenses | 2,599,534 | 2,397,789 | I. 201,745 | 8.4 |
| Net earnings | \$1,411,879 | \$1,024,249 | I. \$387,630 | 37.9 |
| Percent. of expenses | 63.25 | 72.90 | D. 9.74 | ... |

These earnings are included also in the company's general statement.

Pennsylvania & New York.—This company is preparing to cut a double-track tunnel through the "Neck" at and near Vosburg, 4 miles west of Tunkhannock, the county seat of Wyoming County, Pa. The tunnel will be straight and about 3,500 ft. long, exclusive of approaches, and will shorten the line 4 miles, the present track following the line of the East Branch of the Susquehanna around a very sharp bend from Vosburg to Mehoopany. Bids will be received for this work at the office of the Chief Engineer in Towanda, Pa., until Feb. 15 next.

Pennsylvania, Slatington & New England.—This company informs us that track was laid on its road in January from the Delaware River westward to Pen Argyl, Pa., 11 miles. Seven miles of track have also been laid between Deckertown, N. J., and Balaeville. The road is to run from Slatington, Pa., on the Lehigh Valley road, to Pine Island, N. Y., the terminus of a branch of the Erie; it will be 74 miles long.

The suits in relation to the connection with the Wind Gap road near Pen Argyl have been taken up again, negotiations for a settlement having failed.

Phenixville, Pottstown & Reading.—Proposals for grading, masonry and ballast of sections 2 to 13, inclusive, between Phenixville, Pa., and Pottstown, will be received by Feb. 10, at the office of Joseph U. Crawford, Engineer, No. 233 South Fourth street, Philadelphia. Plans and specifications can be seen at the office. The road is a branch of the Pennsylvania Railroad.

Pittsburgh Junction.—The Baltimore & Ohio Co. has paid in the money for the bonds of this road which it subscribed for. Most of the local subscribers have also paid for their bonds, and work will soon be begun on the road.

Pittsburgh & Lake Erie.—In the United States District Court in Pittsburgh, Feb. 6, United States District Attorney Stone made application for a *mandamus* against this company to compel it to make such changes in the railroad bridge over the Ohio River at Beaver, Pa., as will cause the bridge to conform with the statute of the United States and the obligations entered into at the time of its erection. In case the *mandamus* is granted it will, it is said, cause a complete remodeling of the bridge at a cost of \$500,000, besides a long interruption to traffic.

Rutland.—In the case of Chaffee against this company, the Vermont Supreme Court has given judgment for the plaintiff for about \$25,000. The suit was brought to recover on certificates issued in settlement of dividends accruing on the old preferred stock, and is of considerable importance to other stockholders of the company. The Court also included the Central Vermont and the Cheshire companies in the judgment, holding them chargeable as trustees.

